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MANEUVER WARFARE--CONSEQUENCES  
FOR TACTICS AND ORGANIZATION OF  
THE NORWEGIAN INFANTRY

A thesis presented to the Faculty of the U.S. Army  
Command and General Staff College in partial  
fulfillment of the requirements for the  
degree

MASTER OF MILITARY ART AND SCIENCE  
General Studies

by

BJORN TORE SOLBERG, MAJ, NORWEGIAN ARMY  
B.S., University of Bergen, Bergen, Norway, 1983

Fort Leavenworth, Kansas  
2000

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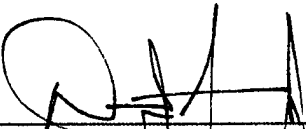
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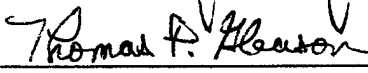
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Name of Candidate: MAJ Bjorn Tore Solberg

Thesis Title: Maneuver Warfare: Consequences for Tactics and Organization of the Norwegian Infantry.

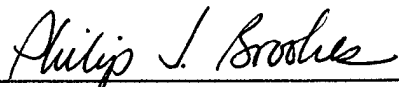
Approved by:

  
\_\_\_\_\_, Thesis committee Chairman  
LTC David J. Lemelin Jr., M.M.A.S

  
\_\_\_\_\_, Member  
LTC Thomas. P. Gleason, M.A.

  
\_\_\_\_\_, Consulting Faculty  
COL Ernest. M. Pitt Jr., J.D.

Accepted this 2d day of June 2000 by:

  
\_\_\_\_\_, Director, Graduate Degree Programs  
Philip J. Brookes, Ph.D.

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

## ABSTRACT

MANEUVER WARFARE--CONSEQUENCES FOR TACTICS AND ORGANIZATION OF THE NORWEGIAN INFANTRY by MAJ Bjorn Tore Solberg, 166 pages.

This study analyzes maneuver warfare theory and how it influences doctrine. The study analyzes the dichotomy between current Norwegian Army doctrine and a doctrine-based maneuver warfare theory. Maneuver warfare acknowledges friction as being fundamental to warfighting. It focuses on defeating the enemy's will to resist by attacking in both the physical and moral dimension. The combined effects of these attacks result from using an indirect approach to reach the enemy's center of gravity. The use of a high tempo of operations will enhance these effects. This can only be achieved by having a decentralized method of command and units that are organized to generate a combined arms effect on the battlefield.

The study provides historical support for the implementation of new tactics through three vignettes. These show tactical principles and trends that can be applied in a modern maneuver warfare doctrine.

Based on technological developments, the study concludes that future tactics of the Norwegian infantry should be based on a concept of dispersed and simultaneous attacks. Infantry units should be reduced in size, get a high reconnaissance capacity, enhanced operational and tactical mobility, enhanced firepower, and a command, control, computer, communications, and information (C4I) system that allows for more dispersed operations.

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## ABBREVIATIONS

AD	Air Defense
ADSL	Asymmetrical Digital Subscriber Lines
AGL	Automatic Grenade Launcher
APC	Armored Personnel Carrier
AT	Antitank
ATV	All Terrain Vehicles
BDA	Battle Damage Assessment
C4I	Command, Control, Computer, Communications and Information
CFE	Conventional Forces Europe
CHOD	Chief of Defense
EMP	Electromagnetic Pulse
EQ	Emotional Intelligence
EW	Electronic Warfare
FOGM	Fiber Optical Guided Missile
GDP	Gross Domestic Product
HG	Home Guard
HMK	His Majesty the King
HPM	High-Power Microwave
IFF	Identification Friend or Foe
IFV	Infantry Fighting Vehicles
IRF	Immediate Reaction Force
LANDNON	Land Command North Norway
MDMP	U.S. Army's Military Decision-Making Process
NATO	North Atlantic Treaty Organization

NCO	Noncommissioned Officer
NCW	Network Centric Warfare
OODA-loop	Boyd's Observation-Orientation-Decision-Action cycle
OOTW	Operations other than war
OPCON	Operational Control
PGM	Precision Guided Munitions
PGMM	Precision Guided Mortar Munitions
PSO	Peace Support Operations
RMA	Revolution in Military Affairs
SHORAD	Short Range Air Defense
SOP	Standard Operating Procedures
TSV	Tracked Strike Vehicle
UMTS	Universal Mobile Telecommunication System
WAP	Wireless Application Protocol

## CHAPTER 1

### INTRODUCTION

#### Topic

The Norwegian Chief of Defense (CHOD) issued in June 1995 a capstone document called *Basic viewpoints on Development and Employment of Norwegian Military Forces in Peace, Crisis and War*. In this document, he states that there is a requirement to adopt a doctrine based on the principles of maneuver warfare in order to get the most effect out of available resources.<sup>1</sup> Based on this recommendation, the Norwegian Government has in the document; *Principal Guidelines for the Development and Activities of the Armed Forces for the period 1999-2002*, stated that,

The fundamental principles governing the use of forces in a military operation is referred to as a military operational concept. Norway is a small country. In the event of any conflict, it must therefore be prepared to face an enemy who is greatly superior both numerically and in weight of forces available. The new military operational concept is based on the ability to identify an enemy's weakest points and to strike at these. The operational concept is also based on maneuver warfare in which rapid and unexpected maneuvers are employed to attack and neutralize the enemy's weak points. In this way, even numerically inferior forces can force an opponent to abandon his military aims without necessarily defeating him physically. Maneuver warfare presupposes a high degree of flexibility, highly mobile units, initiative and speed. The new military operational concept is very demanding in terms of intelligence, modern weapon systems and versatile combat units. It also requires highly skilled and highly trained personnel at all levels.<sup>2</sup>

This new military operational concept or doctrine calls for versatile combat units in order to attack and neutralize the enemy's weak points. This triggers questions like: How will these combat units operate, and how are they be organized?

#### Background

Norway has always had a relative large land force compared to its small population. This has been an army based on a national service system with a relative small peacetime establishment and a large mobilization organization. This land force consists of two components:

the Army and the Home Guard (HG). The Army has a combat strength of approximately 90,000 personnel,<sup>3</sup> and the land component of the HG has a personnel strength of about 77, 000.<sup>4</sup>

During the Cold War, short-warning time and the need for mobilizing a large military force, supported through a complex total defense concept, made large-scale preparations during peacetime necessary. Combined with the need for securing allied reception areas, this forced the army to adopt a defensive doctrine, focusing on retrograde operations and a static area defense in depth. Offensive operations were limited to units and formations conducting attacks as part of an overall defensive concept.

The dissolution of the Soviet Union and the withdrawal of her forces from Central Europe eliminated one strategic axis of attack. With the direct threat to South Norway gone, it was possible to focus on the forward defense of Norway--the defense of North Norway. This is a national defense based on the assumption that only Russia posed a risk to Norwegian sovereignty.

The Army has restructured its maneuver forces into one division, three independent brigades and twenty-two independent infantry battalions. These forces are lead by four land commands, three being responsible for the territorial defense of South Norway. The fourth, Land Command North Norway (LANDNON), being responsible for the main effort, the ambition of meeting a direct invasion against North Norway. Below the land commands, the defense is organized into maneuver forces and territorial forces. The division, brigades, and battalions represent the maneuver forces. The territorial forces are the HG and separate infantry companies. After mobilization, the HG units come under full command of the Army's fifteen territorial regiments. The HG is organized into eighty-nine HG sectors, a HG sector being the equivalent of an infantry battalion with a specific area of responsibility. The HG mission is defense of key points, surveillance, defeat saboteurs and special forces, contain raids, provide support to army formations, and support civilian authorities.

For the Army's maneuver forces, the mission has during the last decade changed from a defensive role to a maneuver concept with the ambition of disrupting an enemy's combat power through an indirect approach. This has resulted in structural changes. The combat support and combat service support capacities has been moved from a local level to a regional level, establishing the land commands as corps level formations to better support the maneuver forces. This restructuring has been most extensive in North Norway where civilian resources are scarce, the environmental challenges most challenging, and the defense ambition the highest.

However, two generations with a defensive doctrine have left their mark on the officer corps, political decision makers, and the population as a whole. Mental change takes time. It is a significant challenge to adapt new tactics and organizational changes in order to support an operational concept based on the principles of maneuver warfare theory. In this context, the infantry, as the major portion of the Army's combat units, seems to have the most significant challenges in order to adapt to such a doctrine.

#### Scope

The scope of this thesis is to analyze the important aspects of maneuver warfare as a theory and by using historical developments find tactics that could be used to support a maneuver-oriented doctrine. The analyzes will cover technological developments in order to see if these tactics can be applied to current and future challenges, and if they have consequences for the organization of different types of Norwegian infantry units.

#### Significance

Only one article has been little published on tactical and organizational consequences for the Norwegian infantry by implementing a doctrine based on maneuver warfare theory. This article "Maneuver Warfare--Consequences for Employment, Organization, and Equipping of the

Infantry Brigades in 6th Division,” was published in the spring of 1999 in the *Norwegian Military Magazine*.<sup>5</sup>

The aim for implementing a maneuver warfare doctrine is to get more effect out of available resources. It is thus of great importance to implement suitable tactics and organizational changes to the infantry units. This thesis will be a good supplement in the future work on implementing such new tactics and organizational changes to the Norwegian infantry units and formations.

### Questions

This thesis will answer a number of questions concerning maneuver warfare theory and how an implementation of this theory as a doctrine should have consequences for organization and tactics in the Norwegian infantry. Initially it has been vital to identify the important aspects of maneuver theory on the tactical level. The second issue has been to find methods that can be used to bridge the gap between theory and tactics plus organization. The third quest has been to find historical examples of tactics that can be employed in current and future operations. The last major question has been to identify what consequences the implementation of such tactics and new technology should have for the organization of the Norwegian infantry.

### Assumptions

This thesis is based on a number of assumptions. These assumptions are the same as the current Norwegian Security Policy has adapted.<sup>6</sup> First, it is a basic assumption for the current security arrangement in Europe is that the Conventional Forces Europe (CFE) treaty will stay in effect and thus limit traditional mechanization of the Norwegian Infantry.<sup>7</sup> Secondly, the defense of Norwegian territory will continue to be the focus of Norwegian Defense Polity and thus will provide the principle guideline for the development of tactics and organization of the Norwegian Infantry. It is a basic assumption that Norway will continue to keep a national service system that

allows for a quantitatively large land force compared to the size of any type of an all-volunteer force. It is assumed that Russia will remain the important security concern towards Norwegian integrity and thus the focus for the defense of Norway. Lastly, it is assumed that NATO will continue as an alliance, requiring Norwegian doctrine, tactics, and procedures to be within the framework of NATO guidelines, to enable Norwegian land forces to fight effectively within the alliance.

### Definitions

A significant portion of this thesis covers a theoretical approach to maneuver warfare theory. This has required the use of a large number of definitions. These definitions are, however, best understood within a context where they are explained within a larger framework. As such, all definitions are found within the thesis text.

### Limitations

Maneuver warfare theory covers the strategic, operational, and tactical levels of war. Since Norwegian infantry units and formations are tactical land forces, this thesis will focus on the tactical level of warfare. However, some Norwegian infantry units, especially those that are designed for the conduct of deep battle, have a value used on the operational level of war.<sup>8</sup> As such, minor parts of the thesis will touch upon the operational level of war.

Maneuver warfare based on the tradition of Sun Tzu covers both conventional and unconventional warfare.<sup>9</sup> Norwegian Security Policy does, however, focus on conventional warfare. This thesis will reflect this focus and not pursue the unconventional part of warfare that for instance Mao Tse-Tung has written about.<sup>10</sup>

It has been an aim to keep this thesis on an unclassified level. As such, existing classified studies and papers that have guided the implementation of the current force structure have not

been used in this thesis. The sources are all unclassified, and the focus has thus been more theoretical than it might have been if classified documents had been used.

### Delimitations

Norwegian Security Policy identifies Russia as the only potential risk to Norwegian sovereignty. Due to limited Russian military capacity and a common border between Norway and Russia in the north, the focus of the environmental part of this thesis has been on the geography and climate of North Norway.

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<sup>1</sup>CHOD Norway, "Basic Viewpoints on Development and Employment of Norwegian Military Forces in Peace, Crisis, and War," (June 1995), 10.

<sup>2</sup> The Royal Norwegian Ministry of Defense, "With the Armed Forces into Year 2000" (A summary of White Paper No. 22 to the Parliament (1997-98), "Principal Guidelines for the Development and Activities of the Armed Forces for the period 1999-2002" (1998) Chapter 8.

<sup>3</sup>The Royal Norwegian Ministry of Defense, "Norwegian Defense: Facts and Figures 1999, (1999) 18.

<sup>4</sup>Ibid., 34.

<sup>5</sup>Bjørn Tore Solberg and Rune Raabye, "Manøverkrigføring – konsekvenser for bruk, organisering og utrustning av infanteribrigadene i 6. Divisjon."

<sup>6</sup>The Royal Norwegian Ministry of Defense, "With the Armed Forces into Year 2000".

<sup>7</sup>Wade Boese and Christopher Ficher, "Pragmatism in practice: CFE seeks to secure Europe's future," 14.

<sup>8</sup>Shimon Naveh, "In Pursuit of Military Excellence," xviii.

<sup>9</sup>Sun Tzu, "The Art of War," vi.

<sup>10</sup>Mao Tse-Tung, "Mao Tse-Tung on Guerrilla Warfare," 7.

## CHAPTER 2

### RESEARCH METHODOLOGY

The organization of the thesis is based on a top-down approach. Starting with the Norwegian national security platform through maneuver warfare theory, the human and moral dimension of warfare, and down to how an application of a maneuver warfare, doctrine should have consequences for tactics and organization of the Norwegian infantry. These consequences appear as results of combining tactical experiences and the application of innovations in technology on the military organization.

This thesis is based on the assumption that current Norwegian national security, risks, and funding remains relatively stable. This forms a basis for the thesis that has made it possible to focus the research on the next step in the thesis, an indepth analysis of maneuver warfare theory. Only through a good understanding of maneuver warfare theory is it be possible to merge relevant historical tactical experiences with modern technological innovations in order to draw conclusion on future tactics and organizational recommendations for the Norwegian infantry.

Numerous writers and military organizations have given their views on maneuver warfare theory. Few writers have published an in-depth analysis of the subject that is directly applicable on the organization of ground forces. This has for this thesis resulted in extensive research covering different aspects of maneuver warfare theory. Nevertheless, different interpretations of maneuver warfare exist. For this thesis, one interpretation, that concurs with the Norwegian Army definition of maneuver warfare theory, has been analyzed in depth. This has been a theoretical approach to maneuver warfare where all research has been based on open literature.

A significant amount of the available literature covering maneuver warfare is based on a humanistic academic approach. This academic foundation makes it difficult to set any precedence or trends that can be applied to future tactics and organizational trends without basing most of the thesis on arguments that may in nature tent to towards being pure speculations. This

has resulted in a significant effort having been put into achieving a logical analysis of maneuver warfare based on a more scientific approach. This has made it necessary to use both mathematical and physical methods to explain and verify important aspects of the different elements in maneuver warfare theory.

The analysis has created results that are more permanent in nature and more applicable on a general basis than for a pure humanistic approach. The results from this analysis have created a sound foundation for the remainder of the thesis.

Experiences from U.S. battle laboratory studies etc. have been reviewed but not used for this thesis. This has been done in order to avoid mixing U.S. Army theoretical foundations that do not fully coincide with this thesis' interpretation of maneuver warfare theory. In addition, this also safeguards against drawing conclusions based on experiments that use technological and organizational factors that have no cultural foundation in the Norwegian Army.

This thesis' interpretation of maneuver warfare theory has a very significant focus on the human and moral dimension of warfare. It has thus been of great significance to analyze this dimension in order to optimize our fighting capacity in relation to the enemy's combat power. A significant portion of available literature on the subject is based on attrition warfare. Nevertheless, sufficient sources exist to give a balanced analysis of the subject.

Based on this thesis' view of what the important aspects of maneuver warfare theory are, the research has focused on finding relevant historical tactical experiences. These have been narrowed down to the changes in German doctrine during World War I and the development of German and Soviet doctrine between the world wars. There is an extensive literature basis for the research of this portion of the thesis. The challenge has been to draw the relevant experiences from the vast sea of sources. The focus has been on successful tactics that support a high tempo.

The description of the Norwegian environment, force structure, risks, and doctrine in chapter 7, are based on factual literature. This is also the case for the description of current trends within Russian doctrine.

Chapter 8 covers current trends in technological developments and innovations which are relevant to maneuver warfare and organizational changes within the Norwegian infantry.

Chapter 9 covers the overall conclusions of the thesis and the recommendations for implementing changes in tactics and organization for the Norwegian infantry.

## CHAPTER 3

### LITERATURE REVIEW

#### Introduction

The research for this thesis is based on open sources that are available through libraries and on the Internet. The thesis covers a very broad area with numerous subject areas. Since very little literature covers more than one subject area, the number of sources for the thesis has become extensive. To secure as high a degree of objectivity as possible, each of the small subject areas have been covered by multiple sources. It has also been an aim to seek out credible and well acclaimed books, articles and authors in order to make the thesis as relevant as possible.

However, an objective view is in the eyes of the beholder. I have been very well aware of this during the work on this thesis, knowing that there are many different views on especially maneuver warfare theory. It has, however, not been the ambition to balance different views on maneuver warfare against each other in order to produce some sort of consensus as a basis for the final results of this thesis. The creation of such a consensus goes against the fundamental nature of maneuver warfare itself and such a broad analysis of the different views on maneuver warfare would go far beyond the scope of this thesis. As such, I have made a fundamental choice on which side of the maneuver warfare discussion I have embraced.

I have viewed the different perceptions on maneuver warfare as basically a cultural issue. Facts concerning maneuver warfare are generally not disputed. However, there are disagreements on the more abstract aspects of this warfighting style. Joel Barker, the futurist, has called such a difference in perception the paradigm effect.<sup>1</sup> This means that based on the observers' points of reference or background, the same issues may be perceived and understood differently. I understand the different views on maneuver warfare theory to be a result of such a paradigm effect.

After having attended three different staff colleges, done considerable reading and some earlier writing on the subject, I have formed my view or paradigm on maneuver warfare theory. This view is consistent with the basic interpretation used on maneuver warfare by the Norwegian Army. Since this thesis eventually is on what consequences maneuver warfare should have for the Norwegian infantry, this analysis will build on the generally established Norwegian Army paradigm on the subject. However, this thesis will do a significantly more in-depth analysis on maneuver warfare theory than the Norwegian Army doctrine so far has done.

### Different Views

Like most students of maneuver warfare, I do accept that there are other interpretations and perceptions of this issue, but I do not concur with them. Donald E. Vandergriff has in his article; "Without the Proper Culture: Why Our Army Cannot Practice Maneuver Warfare," voiced the same opinion. He has put names to two different paradigms concerning maneuver warfare.<sup>2</sup> One side is the *technocrats* that theorize that it is possible to acquire control of the entire battlefield by employing new technologies. The other side is the *maneuverists* or *reformists* that view the human dimension as decisive in future conflict and that new technology can only support and enhance human factors. Vandergriff is obviously a reformist, a view I agree with. This literature review will cover the maneuverist or reformist perception of maneuver warfare.

### Chapter 4--Maneuver Warfare

The Norwegian Army has to have a doctrine that enables it to operate within the framework of the NATO Alliance. It has thus been of great importance to keep this thesis' definitions of important terms as close as possible to existing Norwegian and NATO definitions. However, a number of terms have not been defined by neither the Norwegian Armed Forces nor NATO. In these cases, British or U.S definitions or relevant definitions from encyclopedias and others. Have used in order to create a basis for the thesis' analysis of maneuver warfare theory.

In some cases English language does not have adequate terms to describe certain aspects of mobile operations. In these cases, the thesis uses relevant German expressions in order to avoid having to define new ones.

The analysis of friction is based upon Carl von Clausewitz's perception of the term. James Dewar, James Gillogly, and Mario Juncosa have in their RAND study; *Non-Monotonicity, Chaos, and Combat Models*, confirmed Clausewitz's view on friction through the use of computer modeling. Based on this confirmation, Barry D. Watts has conducted a study; *Clausewitzian Friction and Future War*, which shows that the different aspects of friction will be relevant for future warfare. This is in itself of great importance since it confirms the view on maneuver warfare that this thesis is based upon.

Clausewitz has in *On War* defined both the center of gravity as the hub of all power and the decisive point as a weakness that should be attacked in order to influence the center of gravity. He may as such be viewed as the modern father of the indirect approach. However, it is Sir Basil Henry Liddell Hart that through his extensive writing has been looked upon as the creator of the theory of the indirect approach. This thesis builds extensively on Liddell Hart's theory of the indirect approach as a physical and mental approach to influence the enemy's strengths. Richard E. Simpkin is another writer that in his excellent book; *Race to the Swift*, has developed the indirect approach theory into a more tangible concept that makes it applicable to tactics. Robert Leonhard has used Simpkin's concepts extensively in his three very good books on maneuver warfare. However, none of these writers have developed a methodology that allows for breaking the center of gravity down into physical targets or objectives that can be directly attacked by small tactical forces. Nevertheless, Dr. Joe Strange has been able to do this in his very interesting study "Centers of Gravity and Critical Vulnerabilities." The physical side of the indirect approach builds on Joe Strange's work. He has developed a theory that breaks the center of gravity down into a large number of critical vulnerabilities that can be attacked through Liddell

Hart's concept of operations on multiple lines of operations simultaneously. Sigur Austin has proposed a similar approach in his article "Center of Gravity--Critical Vulnerabilities." This is a concept that also is supported by other theories like Reginald Bretnor's "Decisive Warfare," Michael I. Handel's "Masters of War," Archer Jones's "The Art of War in the Western World," Julian Lider's "Military Theory," and air and maritime theorists like Sir Julian Corbett's "Some Principles of Maritime Strategy," and Robert A. Pape's "Bombing to Win."

William S. Lind has in his insightful book "Maneuver Warfare Handbook," made Colonel John Boyd famous for his theory on tempo. This is an outstanding work that unfortunately has not been published and only manuscripts exist. Other writers like David S. Fadok have thus made his work known through studies like, *John Boyd and John Warden: Air Power's Quest for Strategic Paralysis*. Fortunately for the writing of this thesis, Boyd's two most important works, *A Discourse on Winning and Losing* and *Destruction and Creation* have been available through the Fort Leavenworth library.

The characteristics of tempo can also be explained through the modern theory of nonlinear dynamics. Linda P. Beckerman has in her article "The Non-Linear Dynamics of War," given an excellent account of how Boyd's theory can be confirmed scientifically through the use of this theory. Beckerman's article is confirmed through the three graduate-level books by M. Mitchell Waldrop, *Complexity*; Edward N. Lorenz, *The Essence of Chaos*, and N. B. Tufillaro, *An Experimental Approach to Nonlinear Dynamics and Chaos*.

Martin van Creveld has in his book *Air Power and Maneuver Warfare* pointed out the importance of the combined arms effect as part of maneuver warfare. This is confirmed by Edward N. Luttwak through his analysis of dilemmas and paradoxes in his excellent book *Strategy: The Logic of War and Peace*. Also other important writer on maneuver warfare like John J. Mearsheimer, Stephen Peter Rosen, J. F. C. Fuller, F. O. Miksche, Steven Canby, and

Jonathan M. House confirm this together with the already mentioned theorists like Lind, Leonhard, Simpkin, Liddell Hart, Bretnor, and Boyd.

Martin van Creveld has through his highly praised book *Command on War*, been the most influential theorist on the subject of command. He is heavily supported by most authors on the subject. There does, however, exist a misunderstanding within the writings of a number of these authors. This is on the subject of *Auftragstaktik* being a leadership style and not a command method. This is an issue that has been pointed excellently well out by David J. Lemelin in his thesis "Command and Control Methodology: A Sliding Scale of Centralization." German authors like Franz Uhle-Wettler and Karl-Heinz Frieser confirm this view.

Based on Martin van Creveld's *Command in War*, Thomas J. Czerwinski has in an article "Command and Control at a Crossroads," established a system of different command methods. This thesis has adopted the term *command-by-influence* in order to give a good description of the type of decentralized command method that maneuver warfare calls for. The prerequisites for this command method is based on Franz Uhle-Wettler's article "Auftragstaktik: Mission Orders and the German Experience," and Karl-Heinz Frieser's excellent book *Blitzkrieg-Legende*.

Michael Elliott-Bateman has through two very insightful articles been the most influential contributor to the portion on interpersonal communication. Own experience gained through working on the new Norwegian command and control concept, together with the writings by Martin van Creveld, Simpkin, and Cris Bellamy have had most influence on the relationship between the commander and his staff, and how this should be organized. The same authors have heavily influenced the part on planning and decision making together with Brad Bergstrand's enlightening article "Situating the Estimate: Naturalistic Decision Making as an Alternative to Analytical Decision Making in the Canadian Forces."

The model for explaining the effects of a military organization in battle is based on the value chain from Michael E. Porter's world known book *The Competitive Advantage of Nations*.

This model is also used to explain a better focus on the method part of the commander's intent. The Norwegian Armed Forces also use this model as a basis for evaluating combat effectiveness and for force planning.

#### Chapter 5--The Human and Moral Dimension

The intent of this chapter has been to give an understanding of the human and moral dimension of warfighting. It will cover military decision making, and it will also be used to verify some assumptions made by maneuver warfare theorists on this area.

Ardant du Picq, made this field known through his famous book *Battle Studies*, and S. L. A. Marshal continued this work with his well known book *Men Against Fire*. John Keegan with his excellent book *The Face of Battle*, and Richard Holmes with his book *Acts of War* are modern historians that have taken up du Picq and Marshall's legacy. For this thesis Holmes and Keegan's work will be supplemented with the more scientifically based works by David Grossman, *On Killing*; Anthony Kellett, *Combat Motivation*; Jonathan Shay, *Achilles in Vietnam*; and Elmar Dinter, *Hero or Coward*, have been the most influential for understanding the human and moral dimension in war.

For the understanding of emotional intelligence (EQ) the excellent works by Daniel Goleman, *Emotional Intelligence*; Robert K. Cooper and Ayman Sawaf, *Executive EQ*; and Jeanne Segal, *Raising Your Emotional Intelligence*, have been most influential. Anthony J Sanford with his book *The Mind of Man*, has provided a clear understanding of the how the mind works towards decision-making. Daniel Goleman has on the other hand with his book *Vital Lies, Simple Truths--The Psychology of Self-Deception* provided an insight into how people deceive themselves during the same decision making. Based on historical research, Michael Dewar with *The Art of Deception in Warfare*, and Mark Lloyd with *The Art of Military Deception* support these views.

The focus on how to avoid deception is based on three excellent books by Martin van Creveld, *The Training of Officers*; Sir John Hackett, *The Profession of Arms*; and Richard E. Simpkin, *Race to the Swift*. They are supported by works by Helmut von Moltke, Rommel, Keegan, Holmes, and Dupuy.

The understanding of the science of fuzzy logic and how this can be applied to support decision making is primarily based on the works provided by Philips, *Fuzzy Logic Control and the XA: A Matter of Intuition*; and Marco Iansiti, *Technology Integration*. The two graduate-level books by Lotfi Zadeh and Janusz Kaprzyk, *Fuzzy Logic for the Management of Uncertainty*; and Bart Kosko, *Fuzzy Thinking*, scientifically support these views.

#### Chapter 6--Historical Developments

The intent of this chapter has been to analyze tactical principles and trends from history that are relevant for modern maneuver warfare. Only highly recommended books have been used. For the analysis of the German experiences during World War I, the most influential books have been Bruce I. Gudmundsson, *Stormtroop Tactics*; T. N. Depuy, *A Genius for War--The German Army General Staff, 1807-1945*; Timothy T. Lupfer, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine during the First World War*; and Ian Drury, *German Stormtrooper 1914-1918*. Gudmundson's; On Infantry, and; On Artillery, together with John Ellis, *Eye-Deep in Hell*; Paddy Griffith, *Battle Tactics of the Western Front*; Paul Fussell's, *The Great War and Modern Memory*; and U.S. Army historical publications have been of great help to give a broad view the German innovations.

For the analysis of the German development of doctrine between the world wars, Charles Messenger, *The Art of Blitzkrieg*; James S. Corum, *The Roots of Blitzkrieg*; Barry R. Pose, *The Sources of Military Doctrine*; F. O. Miksche, *Attack*; and Karl-Heinz Frieser, *Blitzkrieg-Legende* have been the most influential works. They have been supported by Liddell Hart's *The German Generals Talk*; and *The Rommel Papers*; von Mellentin, *Panzer Battles*; J. F. C. Fuller, *A*

*Military History of the Western World—Vol III*; John Delaney, *The Blitzkrieg Campaigns*; Rommel, *Attacks*; Len Deighton, *Blitzkrieg*; Simpkin, *Tank Warfare*, and Timothy A. Wray, *Standing Fast; German Defensive Doctrine on the Russian Front During World War II*.

The analyzes of Soviet deep battle is based on the excellent books by Richard E. Simpkin, *Race to the Swift*, *Red Armour*, and *Deep Battle*; David M. Glantz, *Soviet Military Operational Art*, *Stumbling Colossus*, and; *Then Titans Clashed*, James J. Schneider, *The Structure of Strategic Revolution*; Harold S. Orenstein, *The Evolution of Soviet Operational Art, 1927-1991, Volume I*; and P. H. Vigor, *Soviet Blitzkrieg Theory*. These works are supported by original writings from V. K. Triandafillov, *The Nature of the Operations of Modern Armies*; Aleksander A. Svechin, *Strategy*; and Tukhachevsky in Simpkin's, *Deep Battle*.

#### Chapter 7--Environment and Forces

The intent of this chapter has been to give additional background for the thesis to include the environment of Norway, Norwegian forces and Army doctrine, risks to Norwegian security, and a short overview of Russian doctrine.

The description of Norwegian environment is based on facts found in *The Statistical Yearbook of Norway for 1999*. This has been supplemented by Deanna Swaney's travel book on Norway in the Lonely Planet series, the *CIA Facts Book for 1999*, and information from Microsoft's; *Encarta Encyclopedia*. The book *Norwegian Defense; Facts and Figures 1999* has been the principle documents for describing the current organization and future security challenges of the Norwegian Armed Forces. The description of the potential combat zone and concept of operation are based on personnel knowledge: Sherwood S. Cordier, *The Defense of NATO's Northern Front and U. S. Military Policy*; Frank Kitson, *Warfare as a Whole*; and James F. Gebhardt, *The Petsamo-Kirkenes Operation: Soviet Breakthrough and Pursuit in the Arctic October 1944*. The description of the climatic challenges is based on personnel experience: James Lucas, *War on the Eastern Front*; John M. Collins, *Military Geography* and the U.S. Army

historical studies; *Effects of Climate on Combat in European Russia*, and *Terrain Factors in the Russian Campaign*. The current *Norwegian Army Tactical Doctrine* and United Kingdom Army's *Army Field Manual--Volume IV--Part 4--Cold Weather Operations*, has been used to confirm these conclusions.

It has been important for the final analysis, the conclusions and recommendations of the thesis, to give a realistic picture of the Russian doctrine without having to turn to classified sources. This has been achieved by using Nils M. Rekkedal's study "Russian Development of Modern Army Forces;" "Use of Non-linear Warfare theory as part of the Russian Army Reform;" "Development from 1970 to today, the UK Army's "The Army Field Manual--Volume 2--Generic Enemy (Mobile Forces), Part 1 "Operational Art and Tactical Doctrine;" and William P. Baxter's "Soviet AirLand Battle Tactics." These three publications have been supported by a number of articles from the Foreign Military Studies Office: Mohammad Yahay Nawroz and Lester W. Grau, "The Soviet War in Afghanistan: History and Harbinger for Future War;" Jacob W. Kipp, "Russia's Northwest Strategic Direction;" and John E. Sray, "Mountain Warfare: The Russian Perspective."

The description of the current Norwegian Army Doctrine builds on own personal experience and on the Norwegian Army Doctrine.

#### Chapter 8--Changes in Organization and Technology

The intent of this chapter has been to analyze technological and organizational trends that will have an effect on how maneuver warfare based operations are planned and executed. It will also cover how the forces that apply this type of tactics should be organized.

A number of authors have written extensively on this subject. The most influential for this thesis have been Stephen Peter Rosen, "Winning the Next War-- Innovation and the Modern Military;" Alvin and Heidi Toffler, "War and Anti-War;" Douglas A. Macgregor, "Breaking the Phalanx;" Asa A. Clark IV, "The Defense Reform Debate;" David S. Alberts, "Network Centric

Warfare--2nd Edition;" James F. Dunnigan, "Digital Soldiers, George and Meredith Friedman; The Future of War;" John A. English, " Marching Through Chaos;" and Martin van Creveld, "Transformation of War." These have been supported by Trevor N. Dupuy, "The Evolution of Weapons and Warfare;" Raj Gupta, "Defense Positioning and Geometry;" Ralph Peters, "Fighting for the Future;" Paul Seabury and Angelo Codevilla, "War: Ends and Means."

The more facts based part of the chapter is primarily based on articles from *Military Technology*, the Norwegian newspaper *Aftenposten* and different technological home pages on the Internet. This has been supported by different articles in *Jane's Defence Weekly*, and Hugh McDaid and David Oliver, "Smart Weapons."

The part covering organization of forces with corps and brigades and regiments has been heavily influenced by own personal experiences working with the restructuring of the Norwegian Army from 1995 to 1999, ongoing developments within the Russian Army, and by Richard E. Simpkin's, *Race to the Swift*. This has again been supported by the two *Parameters* articles by John R. Brinkerhoff, "The Brigade-Based New Army," and by David Fastabend "An Appraisal of The Brigade-Based New Army."

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<sup>1</sup>Barker, Joel Arthur, "Paradigms," 31.

<sup>2</sup>Donald E. Vandergriff, "Without the Proper Culture: Why Our Army Cannot Practice Maneuver Warfare," *Armor Magazine*, January-February 1998, 20.

## CHAPTER 4

### MANEUVER WARFARE

#### Introduction

To apply one's strength where the opponent is strong weakens oneself disproportionately to the effect attained. To strike with strong effect, one must strike at weakness. It is thus more potent, as well as more economical, to disarm the enemy than to attempt his destruction by hard fight. For the "mauling" method entails not only dangerous cost in exhaustion but the risk that chance may determine the issue. A strategist should think in terms of paralyzing, not of killing. Even on the lower plane of warfare, a man killed is merely one man less, whereas a man unnerved is a highly infectious carrier of fear, capable of spreading an epidemic of panic. On a higher plane of warfare, the impression made on the mind of the opposing commander can nullify the whole fighting power his troops possess. And on a still higher plane, psychological pressure on the government of a country may suffice to cancel all the resources at its command--so that the sword drops from a paralyzed hand.<sup>1</sup>

Sir Basil H. Liddell Hart, *Strategy*

Sir Basil H. Liddell Hart has here captured the essence of maneuver warfare as a warfighting style. Maneuver warfare can however, not fully be understood without comparing it to its counterpart; attrition warfare.

The Norwegian Army and the U.S. Marine Corps has defined maneuver warfare as a: "Warfighting philosophy that seeks to shatter the enemy's cohesion through a series of rapid, violent, and unexpected actions which create a turbulent and rapidly deteriorating situation with which he cannot cope."<sup>2</sup> The focus is to conduct operations in such a manner that they will shatter the enemy's overall cohesion and will to fight. It calls for a mental attitude of doing the unexpected, using initiative, and seeking originality all of which must be combined with a ruthless determination to succeed. As the name implies, the focus is on maneuver; maneuver according to the NATO definition "is the employment of forces on the battlefield through movement in combination with fire, or fire potential, to achieve a position of advantage in respect

to the enemy in order to accomplish the mission.<sup>3</sup>” Maneuver is thus the chief means of achieving decision in a conflict or war.

Attrition on the other hand seeks the reduction of the effectiveness of a force caused by loss of personnel and materiel.<sup>4</sup> Firepower is the chief means of achieving this in combat.

These definitions do, however, little to explain the distinctions between maneuver warfare and attrition warfare theory. The latter implies that success will depend upon which side can last the longer in the process of gradual reduction of effectiveness. The theory of maneuver warfare on the other hand, seeks to inflict losses indirectly by dislocating enemy strength, rather than confronting it.<sup>5</sup> It is the destruction of the enemy’s will and cohesion as much as his materiel that is the key to success. This does however not exclude either theory of containing elements of the other. In practical execution, it becomes a case of where the emphasis lies and of how the commander thinks about solving his mission.

Maneuver warfare theory is characterized by being joint in nature and combining resources of all arms and services. Especially the air dimension is of crucial importance.

The aim is to apply strength against weakness, in contrast to attrition where strength tends to be applied against strength. In order to achieve success, maneuver warfare theory seeks a precise application of force against identified points of weakness. The emphasis is on the defeat and disruption of the enemy rather than attempting to hold or take ground for its own sake. The aim is to defeat the enemy by destroying his will and desire to continue by seizing the initiative and applying constant and unacceptable pressure at the times and places that the enemy least expects. This will invariably include the elements of maneuver, application of indirect and direct firepower, and fixing the enemy.

Maneuver warfare theory is offensive by nature. This does, however, not exclude taking up a defensive posture, when required as a preliminary to resuming the offensive, or to regain balance.

## Friction

### Introduction

Everything in war is very simple, but the simplest thing is difficult. The difficulties accumulate and end by producing a kind of friction that is inconceivable unless one has experienced war.<sup>6</sup>

Carl von Clausewitz, *On War*

Richard Simpkin stated in 1985 in his book *Race to the Swift*, that friction was, to his mind, Clausewitz's most important contribution to military thought.<sup>7</sup> This is a view also presented by John Boyd in his lectures from 1982 and onwards.<sup>8</sup>

Clausewitz's identifies five basic factors: danger, physical exertion, intelligence, uncertainty, and chance,<sup>9</sup> as making up general friction (Gesamtbegriff einer allgemeinen Friktion) or fog and friction of war. This view on friction has generally been acknowledged to be an integrated part of all conflict and war. However, neither NATO, the U.S., nor Norway has gone to the efforts of establishing a definition of the term, and the British definition is "the accumulation of chance errors, unexpected difficulties, enemy actions, and confusion of battle." It is the force that resists all action and which makes the simple difficult and the difficult seemingly impossible."<sup>10</sup> This definition does, however, not shed any additional light on Clausewitz's original description of the term.

Writers of military doctrine have a tendency of defining most important terms in order to create a common understanding within their respective military organizations. This is especially the case for abstract issues. How is it then that the concept of friction is so lightly touched upon in recent doctrine? Is it because Clausewitz has struck an eternal truth, or is it because new ground breaking technology is on the verge of rendering the concept of friction obsolete?

### The Human Dimension

A trend, especially within the U.S. military, sees the last option as realistic within a few years. New technology, digitalization and the establishment of a "System-Of-Systems," will,

according to many advocates, dissipate friction.<sup>11</sup> Such a view will, however, render maneuver warfare theory partly obsolete since the basic concept for this style of warfighting is to reinforce the effects of friction upon the enemy, and thus making him diverge from his original objectives.

Technology has unquestionably changed dramatically since Clausewitz's time. However, this is not the case for the evolution of homo sapiens. Observations based on the theory in Charles Darwin's famous book *The Origins of the Species* states that significant human change requires thousands of years and not only a few centuries. As such, Clausewitz's observations concerning characteristics of war like danger and physical exertion are still very valid.<sup>12</sup> He states that these issues play significant factors in the creation of friction based on observations and deductive reasoning. Today social sciences confirm his statement. This is an area that will be further analyzed in chapter 5.

Clausewitz's statement concerning intelligence, as part of general friction, covers lack of information, inaccurate, and contradicting information.<sup>13</sup> These are issues that technology probably can mitigate the effects of in the future. However, the most important factor in causing this type of friction is Clausewitz's point about accurate recognition making things appear entirely different from what one had expected.<sup>14</sup> This shows that the major cause for friction, concerning information is the human perception of facts and how the resulting intelligence is being used by decision makers. As such, intelligence will be a major cause to future friction as long as there are humans in any part of the observation-orientation-decision-action (OODA) cycle.<sup>15</sup> The OODA-loop, will be further described in the tempo portion of this chapter.

### Nonlinear Dynamics

Scientists during Clausewitz's lifetime, like mathematical physicist Pierre Simon de Laplace (1749-1827), had a concept for a predictable universe and Clausewitz thus had no scientific explanation for his views on chance and uncertainty. Today we have a science covering

nonlinearity that can describe this side of Clausewitz's concept of friction.<sup>16</sup> Barry D. Watts has in his book *Clausewitzian Friction and Future War*, stated that,

Nonlinear dynamics arise from repeated iteration or feedback. A system, whether physical or mathematical, starts in some initial state. That initial state provides the input to a feedback mechanism which determines the new state of the system. The new state then provides the input through which the feedback mechanism determines the system's next state, and so on. Each successive state is causally dependent on its predecessor, but what happens to the system over the course of many interactions can be more complex and less predictable than one might suppose. If the nonlinear system exhibits sensitive dependence on initial or later states, then at least three long-term outcomes are possible: (1) the system eventually settles down in some single state and remains there despite further iterations (long term stability); (2) the system settles on a series of states which in thereafter cycles through endlessly (periodic behavior); or, (3) the system wanders aimlessly or unpredictably (so-called "chaotic" behavior). In the third case detailed predictability of the actual state of the system can be lost over the course of a large enough number of iterations. Chaotic behavior, however, should not be confused with randomness.<sup>17</sup>

There is, however, a significant step from having a science describing chaotic behavior as one option and applying this to war. James Dewar, James Gillogly, and Mario Juncosa of the RAND Corporation have in their study, "Non-Monotonicity, Chaos, and Combat Models," using nonlinear science, managed to link mathematical chaos in a combat model to something like general friction manifested by real war.<sup>18</sup> On a general basis, this shows that combat outcomes are structurally unpredictable, and that while technological advances might temporarily mitigate general friction, they could neither eliminate it or substantially reduce its potential magnitude.<sup>19</sup>

This analysis shows that general friction will continue to exist independent of technological innovation as long as there is a direct human dimension to warfighting, and as long as war is conducted through a continues set of discussions, thus becoming a non-linear process. Based on this conclusion, Barry D. Watts has proposed a hypothesis suggesting that Clausewitz's basis for general friction should be adjusted to three sources: (1) Constraints imposed by human physical and cognitive limits, whose magnitude or impact are inevitably magnified by the intense stresses, pressures, and responsibilities of actual combat; (2) Informational uncertainties and foreseeable differences stemming, ultimately, from the spatial-temporal dispersion of information

in the external environment, in military organizations, and in the mental constructs of individual participants; and (3) The structural nonlinearity of combat processes which can give rise to the long-term unpredictability of results and outcomes by magnifying the effects of unknowable small differences and unforeseen events (or, conversely, producing negligible results from large inputs).<sup>20</sup>

### Conclusion

Man is vulnerable to danger and physical exertion, and his mental perception does not necessarily match what is really happening. This results in internal friction. The application of nonlinear dynamics in war also show that events will not necessarily have the predicted outcome. This shows that Clausewitzian friction will continue to play a major factor in conflict and war.

### Indirect Approach

#### The Center of Gravity

If we watch a torrent bearing down on each successive bank or earthen dam in its path, we see that it first beats against the obstacle, feeling and testing it at all points. Eventually, it finds a small crack at some point. Through this crack pour the first dribblets of water and rush straight through. The pent-up water on each side is drawn towards the breach. It swirls through and around the flanks of the breach, wearing away the earth on each side and so widening the gap. Simultaneously the water behind pours straight through the breach between the side eddies which are wearing away the flanks. Directly it has passed through it expands to widen once more the onrush of the torrent. Thus as the water pours through in ever-increasing volume the onrush of the torrent swells to its original proportions, leaving in turn each crumbling obstacle behind it. Thus Nature's forces carry out the ideal attack, automatically maintaining the speed, the breadth, and the continuity of the attack.<sup>21</sup>

B. H. Liddell Hart, *The Expanding Torrent System of Attack*

Liddell Hart has captured the essence of the indirect approach on the tactical level; bypassing enemy strong points and exploiting the gaps between them. This must, however, not only be applied in two-dimensional maneuvers on the battlefield, but encompass also our mental approach to warfighting. According to Clausewitz, "one must keep the dominant characteristics

of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed.”<sup>22</sup> By this statement, Clausewitz encompasses both the moral and materiel characteristics of own and enemy forces. Our aim must be to focus our combat power against the enemy’s center of gravity and at the same time deny him the ability to influence our center of gravity.

Defeat of an enemy force has a different approach in use of own military power than a destruction of the same force. The concept of center of gravity can be used to explain this crucial difference. A center of gravity that focuses on the materiel strengths of an enemy will lead to a destruction of his forces, while a center of gravity that focuses on an enemy’s will to fight seeks to mentally dislocate his forces. This seems like an easy and logical explanation on the strategic level of war. It also seems reasonable that a strategic center of gravity that focuses on materiel can be reached through the conduct of tactical operations, where the objectives of all engagements are the destruction of the enemy’s manpower and equipment. This is, however, not the case when the strategic center of gravity is the enemy’s moral strength. A direct link between an abstract strength, like his fighting will, down to tactical objectives becomes both difficult and complex. Since maneuver warfare focuses on defeating an enemy and not on destroying him, the indirect approach becomes an abstract approach of transforming higher level ambitions of breaking the enemy’s fighting moral down to destroying specific tactical objectives. This will create an effect that takes away his hub of all power.

NATO has defined center of gravity as “those characteristics, capabilities or locations from which a nation, an alliance, a military force or other grouping derives its freedom of action, physical strength or will to fight.”<sup>23</sup> This definition builds on a Clausewitzian foundation. According to Clausewitz, “The first task in planning for war is to identify the enemy’s centers of gravity, and if possible trace them back to one single one.”<sup>24</sup> NATO joint doctrine agrees with

the Clausewitzian view and states that, "Center of gravity exists at the strategic, operational and tactical levels of operation. More than one center of gravity may exist. Centers of gravity must be identified for both opposing and friendly forces."<sup>25</sup> As such, it is acknowledged now as during Clausewitz's time that there are different centers of gravity. The effort is, however, still to identify one at each level of war, or at the tactical level--one at each level of command. But it is at the same time fully acknowledged that centers of gravity change over time as the situation change and that the "hubs of all power" as such, change with them.

### Decisive Points and Lines of Operation

Maneuver warfare theory calls for attacking the enemy indirectly. This is done through a method of attacking one or a series of decisive points. NATO has defined a decisive point as, "As a point from which a hostile or friendly center of gravity can be threatened. This point may exist in time, space or the information environment."<sup>26</sup> Decisive points have traditionally been seen as geographical in nature. They are the keys to unlocking the center of gravity and can be attacked directly as appropriate. The commander designates the most important decisive points as objectives and allocates resources to protect, control, destroy or neutralize them.<sup>27</sup> This is done by focusing resources through a course of action, or lines of operations. NATO defines "Lines of operation as those that link decisive points in time and space on the path to the center of gravity."<sup>28</sup> NATO's Land Force Tactical Doctrine --ATP-35(B), states that, "Lines of operations are not synonymous with physical axes of advance. They establish the interrelationship between decisive points, in order to construct a critical path to the center of gravity and ensure that events are tackled in a logical progression."<sup>29</sup> Traditionally this has not been the case, and lines of operation have normally been described in terms of interior and exterior. According to U.S. Army's current FM 100-5,

A force operates on interior lines when it operations diverge from a central point and when it is therefore closer to separate enemy forces than the latter are to one another. Interior lines benefit a weaker force by allowing it to shift the main effort laterally more

rapidly than the enemy. A force operates on exterior lines when its operations converge on the enemy. Successful operations on exterior lines require a stronger force but offer the opportunity to encircle and annihilate a weaker opponent.<sup>30</sup>

In maneuver warfare the traditional view on interior and exterior lines of operations must not focus on geography, but instead on tempo. If own forces can operate with a higher tempo than the enemy forces, the traditional effects of having a geographical position enabling operations on interior lines can be achieved even if own forces are operating on geographically exterior lines. As such, a relative higher tempo becomes more important to the conduct of operations than geographical positions.

Lines of operations must in maneuver warfare be viewed as a concept for design of operations connecting own forces with its base of operations and the objective of the operations, normally the defeat of an enemy force. Lines of operations must be used in order to focus combat power toward a desired end state, applying combat power throughout the three dimensions of space, over time and in a logical design that integrates all the military capacities of a joint force in order to converge upon and defeat the center of gravity of opposing forces.<sup>31</sup> As more of military activity focus on operations other than war (OOTW), lines of operations will also cover non-military capacities in order to reach the objective(s) of the operation.<sup>32</sup>

#### Line of Least Resistance and Dislocation

Maneuver warfare seeks to use lines of operations that connect employment of own force against decisive points in a higher tempo than the enemy can respond to. The enemy's response being his physical ability to respond in time in addition to the enemy commander's mental picture of the situation and thus his ability to issue timely orders. Planning and execution must focus on choosing lines of operations where forces can exploit or create conditions that facilitate such a high tempo. Besides taking actions that slows down the enemy physically, plans, and execution must create conditions that delay enemy commanders' decisions on where, when, and how to

respond. Liddell Hart describes this as attacking along the line of least resistance or in the psychological sphere along the line of least expectation.<sup>33</sup>

Attacking along the line of least expectation calls for surprising the enemy commander. If this is achieved, the line of least expectation becomes the line of least resistance. However, psychological surprise is not easily achieved. Psychological surprise calls for good intelligence and an understanding of what the enemy commander sees as our "line of natural expectation."<sup>34</sup> Action must thus be taken to reinforce lines of natural expectations in order to create and exploit lines of least resistance.

It is presupposed that enemy strength will be placed along the line of natural expectation.<sup>35</sup> This strength will, according to Liddell Hart, "fundamentally depends upon stability of control, moral, and supply."<sup>36</sup> Our exploitation of lines of least expectation will dislocate the enemy and render the enemy's strength irrelevant,<sup>37</sup> by bypassing it, threaten it lines of communication, and have a significant psychological impact upon the enemy due to loss of control and reduced moral. Our exploitation of lines of least expectation can be achieved by using; time, space, the information arena, unexpected force ratio or composition, unexpected tactics, or through a combination of these. The desired effects are, according to Robert R. Leonhard; (1) Positional dislocation that renders the enemy's strength irrelevant by causing the enemy to be in the wrong place; (2) Functional dislocation that sets aside enemy strength by causing it to be dysfunctional, generally through the application of technology or combined arms tactics; (3) Temporal dislocation by rendering the enemy's strength irrelevant through the manipulation of time (surprise); and (4) Moral dislocation that offsets the enemy's strength through the defeat of his will.<sup>38</sup>

However, successful dislocation has its price. Edward N. Luttwak<sup>39</sup> and Robert R. Leonhard<sup>40</sup> both describe the paradox of success in war. The more successful our tactics, technology and use of the information arena are, the quicker the enemy will adapt to meet our

success. Our ability to continue to be able to dislocate the enemy thus hinges on our ability to change our lines of operations continuously. In order to achieve this, Liddell Hart suggests that we must adapt our lines of operations and choose according to circumstance between three variants; (1) Dispersed advance with concentrated single aim, such as against one objective; (2) Dispersed advance with concentrated serial aim, such as against successive objectives, and; (3) Dispersed advance with distributed aim, such as against a number of objectives simultaneously.<sup>41</sup> He stresses that the cumulative effects of partial success, or even the mere threat, at a number of points may be greater than the effects of complete success at one point. The effectiveness of armies depends on development of new methods which aim at permitting and dominating areas rather than capturing lines; at the practicable object of paralyzing the enemy's action rather than the theoretical object of crushing his forces. Fluidity of force may succeed where concentration of force merely entails a perilous rigidity.<sup>42</sup>

#### Exploitation and Culmination

The indirect approach calls for creating and upholding the initiative in operations. Only through having the initiative is it possible to defeat the enemy and at the same time avoiding that own forces reach a point when the current operation can just be maintained but not developed to any greater advantage.<sup>43</sup> This point; the culmination point, can for most military organizations only be avoided by choosing lines of operations that employ an economy of force. For own forces this can be viewed as a system of conducting; (a) preparations that enable future maneuver; (b) movement of own force toward an objective; (c) engagement of the objective, and (d) finally exploitation of the situation.<sup>44</sup>

The movement and the engagement have traditionally been seen as the maneuver. However, in maneuver warfare it is of vital importance to also view the effects of the exploitation, the unopposed follow-on movement, as an integrated part of the maneuver. Nevertheless, exploitation can not be expected to occur after only one engagement. A series of

movements and engagements will normally have to be executed before exploitation can be initiated. When a situation is created that enables exploitation, own forces must be able to utilize this opportunity. Such opportunities occur on the battlefield as results of own planning and execution, friction, and enemy mistakes or indecision. However, these "windows of opportunity" are very time dependent and pass quickly on a fluent battlefield as results of enemy reactions, friction, own lack of initiative or own forces lacking ability to change over to an exploitation mode. The last issue has mental, organizational and logistics dimensions.

As mentioned earlier, Liddel Hart points out that dispersed advance with distributed aim, can create cumulative effects that may paralyze the enemy's action.<sup>45</sup> Lines of operation that have a series of rapid movements and engagements support this ambition. However, history tells us that it is the exploitation, the pursuit, that often forces culmination upon the enemy and results in defeats.<sup>46</sup> Since exploitation is an action that the enemy has not been able to prevent, and since an exploitation generally goes deep in order to threaten the enemy's lines of communication, it leads to psychological dislocation that fundamentally springs from the sense of being trapped.<sup>47</sup> This entrapment, or moral dislocation, is a combined result of positional and functional dislocation, and the commander's personal temporal dislocation, due to lack of control.

Since exploitation is difficult to achieve, it requires uncommitted means that can be employed once a window of opportunity has been opened in order to sustain the momentum of the exploitation. Without such means, own forces will most likely reach their culmination point ahead of being able to defeat the enemy. A precondition for a successful employment of such means, or reserves, is the availability. This requires that own forces set the conditions for the creation of the necessary opportunities at a time and place where it is possible to employ these uncommitted means.

This calls for shaping the enemy force in time, space and the information arena. This has traditionally been done through a combination of fixing the enemy and dislocating his cohesion.

On the tactical level, most armies have done this by use of tactics. However, the effects of tactics can be increased by organizing forces to achieve a synergy effect as a result of optimizing different forces for the fixing and maneuver functions. The aim is to create a deliberate force dichotomy. Sun Tzu called this the ordinary (fixing) and extraordinary (maneuver) force.<sup>48</sup> Richard E. Simpkin had the same approach in his extraordinary book; *Race to the Swift*, by suggesting the establishment of a heavy holding force and a light mobile force.<sup>49</sup>

In order to avoid own culmination and being able to utilize windows of opportunity, there should exist flexibility, reserves, in both force types. The balance between the two force types and how large a reserve should be, will depend upon strategic and operational considerations such as strategic defensive or offensive posture, available time and space, technology, training, operations other than war, and force ratio between own and opposing forces.

#### Critical Capacities, Requirements and Vulnerabilities

Based on a Clausewitzian approach, this thesis has earlier stated that centers of gravity and decisive points can be found on all levels of command. This is a theoretical approach that will find significant practical challenges at the lower tactical and technical levels of war during the conduct of operations. These levels of war generally have their focus on the execution of operations and not on the planning of them. As such, they lack the both planning capacity and expertise to do a deep analysis of enemy and own centers of gravity. This is, however, not a significant problem as long as own forces are used to execute dispersed advance with concentrated single aim, or dispersed advance with concentrated serial aim.<sup>50</sup> This is due to the individual unit being focused against one objective at the time. The objectives may then be perceived to be tactical or operational decisive points. The challenge in this case is how the decisive point should be rendered inoperable in order to influence the center of gravity.

British maritime doctrine has an indirect approach for reaching a decisive point. The decisive point is attacked through its critical vulnerability. This is defined as a vulnerability in a

force's fighting system which, if destroyed or otherwise controlled, will lead to systematic disruption of the force.<sup>51</sup> The nature of maritime operations is, however, significantly different than land warfare in that a maritime fighting system (vessel) must be viewed as a system of systems compared to an army unit. An army unit is usually viewed as being composed of a large number of autonomous systems (vehicles and soldiers). If the aim is to disrupt, or functionally dislocate, the cohesion of an army unit, the use of critical vulnerability is an excellent approach. As such, the elimination of one system or capacity within a combined arms unit will have a synergetic degradation of the unit's fighting capacity, thus rendering it an easier objective for bypassing, neutralization, defeat, or destruction.

However, the basic problem of not being able to cope with the complexities of centers of gravity and decisive points still persist when the lines of operations are dispersed advance with distributed aim, i.e. against a number of objectives simultaneously.<sup>52</sup> If this is going to give the cumulative effects that Liddell Hart perceived, there has to be established an easier system of focusing the combat power of squads, platoons and companies, than at decisive points that are often more abstract than physical in nature.

Dr. Joe Strange has established such a system without diverting from a pure Clausewitzian approach. He has eliminated the use of decisive points and instead stated that all centers of gravity must have critical capacities in order to retain the hub of all power. His definition of these critical capabilities are primary abilities which merits a center of gravity to be identified as such in the context of a given scenario, situation or mission.<sup>53</sup> He uses the definition of critical capacities to identify certain requirements that are essential in order to uphold or sustain the critical capacities. He has defined these critical requirements as essential conditions, resources and means for a critical capability to be fully operative.<sup>54</sup>

By establishing a hierarchy of essential conditions, resources and means that are directly critical for the hub of all power in any given situation, he has defined lines of operations that

directly will influence the center of gravity. In addition, he has refined the use of critical vulnerabilities in this context. According to Dr. Strange, a critical vulnerability is defined as critical requirements or conditions thereof which are deficient, or vulnerable to neutralization, interdiction or attack (moral and physical harm) in a manner achieving decisive results--the smaller the resources and effort applied and the smaller the risk and cost, the better.<sup>55</sup>

Critical vulnerabilities have now in fact become specific targets that are vulnerable to use of own military force. Based on Dr Strange's system of; center of gravity--critical capacity--critical requirements--critical vulnerability, it is now practically possible to use Liddell Hart's indirect approach based on dispersed advance with distributed aim, i.e. against a number of objectives simultaneously. In addition, the direct breakdown from center of gravity to critical vulnerabilities, makes it possible for higher headquarters to better focus the employment of own forces, thus creating the desired cumulative effects of attacking both simultaneously and sequentially at a number of critical vulnerabilities.

### Conclusion

The indirect approach aims at attacking the enemy both mentally and physically in order to achieve dislocation. The use of the indirect approach has the ability of achieving quick success or achieving victory with the use of fewer resources. However, a prerequisite is that planning must take equally into consideration the mental and physical dimension. They are interdependent on each other and mutually supportive. It is the synergy effect of these two dimensions together that makes the indirect approach a successful tool in maneuver warfare.

### Tempo

#### Physical Laws

Speed is the essence of war. Take advantage of the enemy's unpreparedness; travel by unexpected routes and strike him where he has taken no precautions.<sup>56</sup>

Sun Tzu, *The Art of War*

Sun Tzu used speed to temporal dislocate the enemy. To us speed is normally perceived to be a rate of motion or performance.<sup>57</sup> This definition is however not enough in order to understand the temporal dimension of maneuver warfare theory.

Richard E. Simpkin and Robert R. Leonhard have used physical laws in order to achieve a better understanding of the temporal dimension. According to them, the speed should be exchanged with a more precise term--velocity. Velocity is like speed, distance over time, but distinguishes itself from speed by also being a vector quantity.<sup>58</sup> By using velocity instead of speed, it is possible to apply Newtonian physics to form a better terminology and understanding of the temporal dimension.

According to Newton, mass ( $m$ ) multiplied by velocity ( $v$ ) equals momentum ( $M$ ), ( $mv=M$ ), and mass ( $m$ ) multiplied by acceleration ( $a$ ) equals force ( $F$ ), ( $ma=F$ ). Applying these physical terms to military terms means that mass ( $m$ ) is the size of a unit, and velocity is the movement of the unit in one direction. The size of the unit, its mass, generally gives an indication of its firepower. The momentum ( $M$ ) can then be viewed as firepower being applied on the enemy. However, on a fluent battlefield, the enemy maneuvers and the firepower has to be focused on the enemy to give an effect. This effect, the force ( $F$ ), is by Leonhard called the applied will of the commander.<sup>59</sup> According to  $F=ma$ , the acceleration( $a$ ) is the ability to reduce or increase the velocity, and/or shift the velocity from one direction to another. In this context, acceleration is directly linked to the maneuver warfare understanding of the term tempo.

In NATO's *Land Forces Tactical Doctrine--ATP-35 (B)*, tempo is described as the rate or rhythm of activity relative to the opposition, within tactical engagements and battles and major operations. It incorporates the capacity of the force to transition from one operational posture to another. Tempo seeks to impose threats to which the enemy is increasingly unable to react; his responses are made inappropriate in terms of either time or space.<sup>60</sup>

The NATO description refers to rate and rhythm. These terms are generally associated with frequency. In physics frequency is the number of periodic oscillations, vibrations, or waves occurring per unit of time.<sup>61</sup> When frequency is linked to acceleration, both the rate and amplitude can change significantly. It is this change in frequency that must be greater than the enemy's in order to be able to achieve temporal dislocation. This is having a relative higher tempo than the enemy.

Achieving a high tempo in a military organization is, however, a complex challenge where numerous elements are dependent and interdependent. According to Richard E. Simpkin, tempo is a complex of seven elements, all of them complex in themselves and all of them mutually interacting. These elements are; (1) physical mobility; (2) tactical rate of advance; (3) quantity and reliability of information; (4) C3 timings; (5) time to complete moves; (6) patterns of combat support; and (7) patterns of service support.<sup>62</sup> Each of these elements is subject to friction, and the interaction of different elements lead to additional potential friction. This is the friction synergy effect that creates an increasingly vulnerable military organization if measures are not implemented to reduce the complexity within each element.

#### Boyd's Theory

Colonel John Boyd has developed a theory that fully takes advantage of change in frequency (acceleration) and reduced complexity in Simpkin's seven elements. During the Korean War, as an F-86 Sabre pilot flying up and down "MiG Alley," he developed his first intuitive appreciation for what he would later refer to as fast transient maneuvers.<sup>63</sup> Although the Soviet-built MiG-15 was technologically superior in many respects, the F-86's full power hydraulic flight controls and bubble canopy provided F-86 pilots with the ability to shift more rapidly from one maneuver to another during aerial dog-fights.<sup>64</sup> These two superior features made it possible for F-86 pilots to rapidly change direction (acceleration) rendering the enemy response inappropriate to the new tactical situation. Through successive repetitions of this

maneuver, the MiG-15 came to a positional disadvantage where it was possible for the F-86 pilots to shot them down. This tactics resulted in an establishment of an impressive ten to one kill ratio against the formidable MiG-15.

Boyd was reassigned during the war to the Fighter Weapons School at Nellis Air Force Base. As an instructor he codified these air-to-air combat lessons of maneuver and countermaneuver in a tactical manual entitled, *Aerial Attack Study*.<sup>65</sup> A few years later at he quantified these tactical ideas in the form of his energy maneuverability theory. After retiring, he set out to expand his tactical concepts of aerial maneuver warfare into a more generalized theory of conflict leading to the essay, "Destruction and Creation." In this essay, Boyd combines Gödel's theorem of incompleteness, Heisenberg's principle of uncertainty, and the Second Law of Thermodynamics. By doing this he shows that; (1) there is disparity between what actually is happening in a system and what is being observed (Gödel); (2) that an observer has a direct impact upon the observed phenomena (Heisenberg); (3) and that when action is taken within a closed system this leads to disorder (the Second Law of Thermodynamics).<sup>66</sup> Boyd concludes that,

Taken together, these three notions support the idea that any inward-oriented and continuous effort to improve the match-up of concept with observed reality will only increase the degree of mismatch. Naturally, in this environment, uncertainty and disorder will increase, we can expect unexplained and disturbing ambiguities, uncertainties, anomalies, or apparent inconsistencies to emerge more and more often. Furthermore, unless some kind of relief is available, we can expect confusion to increase until disorder approaches chaos--death.<sup>67</sup>

Boyd has through a mathematical and physical approach, shown that change produces disorder, and that a high rate of change will transcend a system from disorder into chaos.

However, while it is very favorable for us that the enemy plunges into disorder and chaos, it is vital that we avoid doing so. In order to support these two opposite objectives, Boyd developed a theory based on an ongoing loop, where observation and action became an integrated part of each rotation of the loop. By doing this, he reduced the effects of the discrepancy between

the observed and the reality, that was created as a result of the action, to a minimum. The turnaround time, frequency rate, became irrelevant for own forces while a high rate would bring the enemy from disorder to chaos in a shorter time span. It also showed that the more severe actions, higher frequency amplitude, that were created a more significant reactions from the enemy might bring the enemy into chaos earlier than less severe actions, but this was achieved by creating a higher degree of disorder for own forces. High frequency rate is as such more desirable than a high frequency amplitude.

Boyd's theory advocates a form of warfare that is more psychological and temporal in its orientation than physical. The objective is to break the spirit and will of the enemy command by creating surprising and dangerous operational or strategic situations.<sup>68</sup> This is achieved by operating at a relative higher tempo than the enemy. By doing this, there is created a widening time gap between action and reaction that increasingly dislocates the enemy temporal, functionally and mentally. The mental dislocation is reinforced by a series of actions and reactions that distort the decisions makers mental picture of what is happening and what is actual reality.

Boyd's theory focuses on minimizing own friction, and on creating and exploiting the frictions faced by the enemy. High tempo, initiative at the lower levels within a chain of command and a shared vision of a single commander's intent reduces own friction. Rapid attacks with a variety of actions helps to overload the enemy's capacity to identify and respond timely to serious threats in a logical manner. This opens for steadily reducing the enemy's physical and mental capability to fight.

The description of Boyd's theory has so far been limited to observation and action. A series of observations does, however, not result in a readjustment of the mental perception of what is observed. This readjustment is by Boyd called orientation. The orientation should ideally result in a mental perception of the situation that is very close to the real situation. Based on the

orientation it is possible to decide to execute an action (engagement). We now have Boyd's well-known loop through which all rational human behavior, individual or organizational, can be depicted as a continual cycling through four distinct tasks; (1) observation; (2) orientation; (3) decision; and (4) action (the OODA-loop).

### Boyd's OODA Loop

The most challenging part of the OODA-loop is the transition from observation to orientation. This is due to orientation being a result of; generic heritage; cultural tradition; previous experiences; and unfolding circumstances.<sup>69</sup> The orientation becomes a result of the observer's paradigm. Pending the observer's paradigm, the orientation results a mental perception that is close to the real world situation, or this mental perception can be significantly different from what is really happening. The observer's paradigm can thus be very helpful or it can in fact by itself contribute to deceive the observer. This paradigm effect<sup>70</sup> has been explained in chapter 3.

In order to survive and thrive within a complex, everchanging world of conflict, we must be able to orient ourselves effectively. This includes to quickly and accurately develop mental images, or schema, to help us comprehend and cope with the vast array of threatening and non-threatening events that face us on the battlefield. Observations that match up with certain mental schema call for specific decisions and actions. The timeliness and accuracy of these decisions and actions are directly related to our ability to correctly orient and reorient to the rapidly unfolding, perpetually uncertain events of war.<sup>71</sup> Mismatches between the real world and our mental perception will generate inaccurate decisions and actions. These, in turn, produce disorientation that again diminish both the accuracy and the speed of subsequent decision-making. Left uncorrected, disorientation will steadily expand our OODA-loop until it eventually becomes a death trap.

In order to avoid that our OODA-loop becomes our death trap and instead ensure that the enemy is caught in his, it is vital to establish a broad basis for understanding what is actually being observed. This calls for giving the observers a broad experience background, and keeping a high tempo to ensure that own forces influence unfolding circumstances as much as possible on the battlefield. The broad experience, background, or ultimately intuition narrows the time gap between observation and orientation, thus allowing for rapid decisions and actions. This again is a prerequisite for a high tempo.

Based on establishing such a broad basis for understanding observations, Boyd did not advocate any practical recipes for success. He refused to advocate any one approach, any one formula, since following a single path to victory makes one predictable and vulnerable. He instead advocated the study of theories not theory, and doctrines not doctrine, in order to accumulate a broad experience basis. Then, as a specific conflict unfolds, we can pick and choose from these experiences as the situation unfolds.

#### War of Protraction

Boyd's theory has been criticized for having one flaw. This is the strict emphasis on the high temporal dimension of conflict. However, all conflicts do not have a high tempo. Mao Tse Tung advocated the concept of war of protraction,<sup>72</sup> where extended time is used to preserve own forces and inflict losses upon the enemy. Many OOTWs are wars of protraction and they are perceived as having a low tempo since there is a significant time span between actions. Lack of action does not however indicate that the OODA-loop has a low frequency rate. The frequency rate of the OODA-loop can be very high, but the observation-orientation-decision part of the loop does not necessary lead to direct action. Avoiding numerous actions is done in order to conserve own forces. Remember that it is also a decision not to engage in any direct action, or engagement. A high frequency rate on the OODA-loop, with only direct action being taken when the engagement has a significant impact, is a concept based on having a high amplitude on a

number of OODA-loops. As such, the basic perception of protracted conflicts having a low tempo can be very deceiving. Instead, the basic perception should be of a complex OODA-loop system with a generally high frequency rate and a varying frequency amplitude.

### Nonlinearity

Nonlinearity means that the output is not directly proportional to the input. Instead the ratio of output can rapidly grow or can deescalate to miniscule value.<sup>73</sup> In non-linear systems the emergent behavior of the whole is greater, or could be less, than the simple addition of the interactions. A single brain cell doesn't think, but the interactions between the large mass of brain cells in our brain exhibits the emergent property of thought.

Nonlinear systems branch off (bifurcate) into multiple states that each can be stable. From a monostable state, it will bifurcate into multiple states that each will settle down to one state. This creates a multistable system. The number of possible states that can be stable for a system is, however, limited and continues bifurcation will ultimately lead to chaos and unsuitability. However, between the multistable system and chaos, there will exist an opportunistic regime or transition zone that is conducive to adaptation.<sup>74</sup>

The opportunistic region for adaptation has many available stable states. This region can be reached in many non-linear systems by causing bifurcation through increasing the magnitude of the control parameters. It is thus possible to take advantage of the most opportunistic portion that is immediately preceding the chaotic region. This is often referred to as operating on the edge of chaos. The difficulty of using this region is the risk of having the system pushed into the chaotic region.

War is by nature a nonlinear system. Control parameters are the determinants of a system's state. As these are slowly varied, the system stable structure can change, leading to a different set of stable states. Typical classes of control parameters are those that affect the inputs

that disturb the system and the interactions within the system. In a military organization, these can be viewed as a form of input to each unit or subunit.

For a military organization, this can have a significant impact. The ambition of synchronizing a unit to achieve concentration, will generally result in one subunit having to wait until the other sub-units have changed their states have been changed. This generally leads to a deacceleration of the tempo in an operation. In addition, synchronization by nature seeks to move own forces away from operating on the very beneficial edge of chaos. Synchronization thus works contradictory to the intent we have for operating under a high tempo. Extreme synchronization can in fact lead to mono-stability where we become predictable and vulnerable.

Some states provide more opportunity for success than others. This relative value is expressed by a concept called the fitness landscape.<sup>75</sup> The fitness landscape defines how well suited its occupants are to optimize the use of situations. For military units, it is the earlier mentioned window of opportunity. The aim is for the occupants while moving between states to optimize their position on the fitness landscape. For military organizations, this mean they are better able to survive and thrive because they in this state are better suited to observe, orient, decide and act. Since this is a neverending process, the units seek to move along the fitness landscape from state to state, changing that landscape as they move. This path along that fitness landscape is the unit's line of operations. The fitness landscape is itself changed by our actions, since these actions impact the potentially available states and the level of fitness associated with each.<sup>76</sup> It is continually dynamic and close coupled with us. Our enemy is also making decisions and this affects not just their fitness landscape, but our fitness landscape as well. It thus becomes of vital importance to us to be in front of our enemy's ability to impose change on us. Keeping a high tempo becomes essential. However, tempo must not be pursued at all costs. There must be some control measure that ensures that each unit does not only focus on optimizing their individual situation. These loose control measures must interconnect units in order to sub-

optimize the individual in order to eliminate that individual optimization results in the creation of a negative fitness landscape for other units.

### Conclusion

Boyd's theory on tempo fits extremely well with the nonlinear dynamics of war. He advocates that we by having a relatively higher tempo, operate inside adversary's observation-orientation-decision-action loops to enmesh adversary in a world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos . . . and fold the adversary back inside himself so that he cannot cope with events or efforts as they unfold.<sup>77</sup> He also through the observation--orientation part of the OODA-loop ensures that we seek to stay on top of the fitness landscape, thus ensuring own combat power and protection.

### Combined Arms

#### Introduction

National styles differ in war, as they do in the pursuit of peace. Embodied in the tactical orientation of military forces and revealed by their structures, these national styles reflect not only the material and human attributes of societies but also their collective self-images.<sup>78</sup>

Edward N. Luttwak, *The American Style of Warfare and the Military Balance*

In his book *Air Power and Maneuver Warfare*, Martin van Creveld states that the concept of combined arms is the least understood principle of maneuver warfare.<sup>79</sup> Combined arms have traditionally been understood to encompass brigades or higher formations that are composed of a mix of units from different branches of the army. This force mix provides formations with a combined arms effect that is greater than the sum of the individual capacities.<sup>80</sup> This thesis will, however, not focus on the traditional branch mix, but in-stead analyze how this combined arms synergy effect can be optimized within a military organization and within the individual unit.

## Effects

Advances in technology have created weapons that can reach any point of a battlefield and blast a concentrated force to smithereens.<sup>81</sup> This revolution in precision guided weaponry makes it more difficult to conduct operations based on maneuver warfare theory, and forces have to adapt technologically, organizationally and tactically in order to be successful.<sup>82</sup> For a small nation with limited resources, such an adaptation must focus on quickly inflicting significant losses on the enemy's critical vulnerabilities in order to effect his center of gravity. As small a portion as possible of available resources should be diverted to defensive means in order to protect our own critical capacities. Such a balance of resources within a force structure can only be achieved if it is directly focused at a potential enemy's known critical capacities and vulnerabilities. According to Edward N. Luttwak, this results in that one allows the enemy to dictate one's force-structure and tactics; the "organizational initiative" is conceded in order to seize the operational advantage.<sup>83</sup>

Traditionally, the area of operations has been divided into a deep area, main battle area and a rear area. Due to an increasingly fluid battlefield, the boundaries between these areas are being erased. The functions that characterize these areas will however remain. The rear areas will require forces for protection of infrastructure, headquarters and logistics. The main battle area will have a need for fixing forces and maneuver forces, and a utilization of the deep area will require forces for striking enemy critical vulnerabilities. This calls for a force structure with four different types of forces; (1) protective; (2) fixing; (3) maneuver; and (4) deep operations forces.

Combined with the fact that there will always be a gap between available resources and requirements to solve all tasks, there has to be strict prioritization in order to implement a force structure that gives the most effect. A force where each force type is organized towards solving its tasks will give the most "bangs for the buck." This will also create a force structure where it is possible to implement new technologies in limited numbers and still achieve significant effects.<sup>84</sup>

This implies that forces that are responsible for general protection and for fixing an enemy maneuver force should be organized for a low resource requirement while own maneuver forces get the preponderance of available resources in form of new technology. If maneuver forces are to be successful, they must have the ability to create windows of opportunity and exploit these. This concept does, however, create a force structure that goes against the general trend of standardizing units and formations within a nation's military organization. Since resource basis, environments and potential enemies also differ between nations, this concept also implies that military alliances must accept a wide diversity of available forces.<sup>85</sup>

The different combat and combat support arms each have characteristics that can be identified within the triangle of mobility, protection and firepower.<sup>86</sup> These characteristics may be of a permanent nature or they may change. Artillery will, for instance, always be characterized by having high firepower, while light airmobile infantry goes from having very high mobility when mounted to low mobility when dismounted. These characteristics create strengths and weaknesses within a pure organization. Based on a maneuverist approach, it is important for own forces to use these strengths to our advantage and to exploit the enemy's corresponding weaknesses. This is using an asymmetrical force to gain advantages that render the traditional force ratio irrelevant. As such, maneuver warfare calls for avoiding the use of armor against armor, artillery purely for counter fire, and pitting infantry against infantry.<sup>87</sup>

Fuller advocated pure tank formations in order to achieve a high tempo on the battlefield.<sup>88</sup> History has shown that this was not sound advice.<sup>89</sup> Today, brigades are usually organized according to the combined arms philosophy. Such formations have different types of units with characteristics that complement each other and thus reduce vulnerabilities. At the same time, the force mix gives the commander the means to utilize the advantages of force asymmetry. The use of combined arms formations against each other may, however, only lead to a series of actions and reactions, where the asymmetry in use of forces only change in order to

gain an advantage. One logical organizational approach for own forces to break this adverse circle, is to establish the combined arms effect on a lower level of command. By implementing a combined arms effect at a lower level of command than the enemy has, it is possible to exploit his weakness, with an additional synergy effect, while at the same time fending off his strength.

Edward N. Luttwak has in his book; *Strategy; the Logic of War and Peace*, described the paradox of lethality.<sup>90</sup> He states that the more lethal a weapon system is, the more quickly an enemy develops countermeasures in order to survive. Such countermeasures do, however, usually have side effects that may create vulnerabilities that other weapon systems may exploit. This is in itself the basis for the combined arms effect. Based on the misconception of standardization, new weapon systems are, however, often fielded based on replacing older weapon systems in-stead of evaluating the organization as a whole. Such a supplementary approach to implementing resources and new technology does not achieve the best effects ( $F=ma$ ). Instead, new technologies should be implemented based on a complementary approach.<sup>91</sup> This will allow older weapon systems to exploit the weaknesses that the enemy counter measures open. Diverse second best equipment should be fielded alongside their optimal counterparts.<sup>92</sup>

Enemy reactions to effective weapon systems will also be changes in tactics in order to reduce our effects on him and at the same time allow him to continue towards his objective. Such changes in tactics, techniques and procedures will, however, be unlike those he is proficient in and organized for conducting. This will reduce his cohesion and tempo, and open vulnerabilities that own forces can exploit with our other combined arms effects. This exploitation must not only be limited to different characteristics with firepower, like changing between direct and indirect fire, but must cover the whole spectrum of characteristics within the movement, protection and fire power triangle.

The characteristics within this triangle changes with the environment. Mechanized units will for instance have good mobility on open farmland, but close to no mobility in deep snow or

on wet moorland. Such significant changes in characteristics occur with changes in geography, elevation (height), climate, infrastructure and time (day, night, and season), and must be organizationally exploited to the full. These organizational asymmetrical advantages must then be used operationally and tactically to render the enemy's strengths valueless. Leonhard has called this the Alcioneus Principle.<sup>93</sup>

### Flexibility

Flexibility has traditionally been understood to have a number of maneuver units available. Three subunits have always been better than having two, and having four subunits has been the ideal for those who can afford such organizations.<sup>94</sup> Such a traditional view on flexibility is based on the concept of force ratios being all-important for achieving success on the battlefield. In maneuver warfare, force ratios are, however, less important and it is instead the effects the individual unit can inflict on the enemy that matters the most. Since such effects are best achieved by using windows of opportunity and taking advantages of available synergy effects, a military organization must be flexible and well rounded; self-contained, and not too specialized.<sup>95</sup> This approach to flexibility calls for units at all levels of command to have an organization that ensures a sustained and continuous combined arms effect.

It is a prerequisite for successful use of maneuver forces to have available sufficient space. With limited space, it is difficult to achieve deception and own lines of operation tend to become natural lines of operation, where the enemy is prepared to meet us. In situations with limited space where no flanks exist, artificial ones must be created.<sup>96</sup> This calls for having sufficient fixing forces in order to allow the maneuver forces to exploit the gaps they create.<sup>97</sup> These fixing forces must not only be able to fix and contain the enemy, but also be able to breach an enemy front in order to pass the maneuver forces. Once the maneuver forces have disrupted forward enemy forces, the fixing forces must be able to destroy them piecemeal. This is the same concept for using different types of forces that the Germans used for the conduct of Blitzkrieg. It

gives commanders the necessary flexibility to shift quickly from one phase of an operation to the next, and to sustain a high momentum over operations with a significant duration.

A significant portion of own strategic, operational and tactical vulnerabilities will change as operations progress, and the threats against them will change pending enemy capacities and methods. The forces that protect these vulnerabilities must be flexible enough to meet both of these changes. They must also be able to support the efforts of both maneuver and fixing forces in the transition period from crisis to war, and during the period after the enemy has reached his culmination point. Protection forces must thus be organized to meet multiple challenges.

Flexibility in a military structure can reduce the need for a reserve in the traditional sense, as shown by utilizing the combined arms effect and employing fixing and protection forces for different purposes. The concept of attacking both simultaneously and sequentially at a number of critical vulnerabilities also reduces the need for reserves, since a failure to reach some critical vulnerabilities (targets) will not necessarily reduce the cumulative effect of the operation.

Richard Simpkin does, however, state that a system as a whole must contain an element of mass which remains available to respond to changes in the situation.<sup>98</sup> Such situations can be the need to go against additional targets, employ additional forces to reinforce deception measures, secure lines of operations or to exploit a limited pursuit.

Maneuver forces have a limited endurance. In order to keep up a prolonged high tempo it is necessary to have additional forces that can be employed to sustain the momentum. Such forces can be echeloned along the same lines of operations or operate on other lines of operations. Only by relieving forces periodically is it possible to sustain an overall high effect with a relatively small mass, since such an approach reduces manning and logistics. This is also a self-reinforcing concept since an increasingly overall higher tempo increases the effect at the same time and reduces the relative logistics consumption.<sup>99</sup> The rotation of forces also gives the opportunity to quickly bring equipment and logistics up to a technical level that will ensure a

continued high tempo. This also has a crucial moral factor since prolonged operations severely reduces the effectiveness of personnel.<sup>100</sup>

The only factor that can guarantee flexibility is training and still more training.<sup>101</sup> Good education and necessary training is a prerequisite for achieving technical and tactical proficiency, and unit cohesion. Without these fundamental factors, it will not be possible to sustain a high tempo, act in accordance with higher commander's intent and exploit windows of opportunity.

### Conclusion

The aim of standardizing forces into similar units is in maneuver warfare a misconception. Instead, diversity should be viewed as a strength in order to achieve optimal fighting power against a potential enemy. Four types of forces; (1) protection; (2) fixing; (3) maneuver; and (4) deep operations forces, should be the basis for the land forces. Within these forces there must be a balance between the arms in order to exploit the weakness of the enemy and in order to create weaknesses. All levels of command down to squad and section must have a balanced combined arms effect in order to have necessary flexibility.

### Command

#### Introduction

By command I mean the general's qualities of wisdom, sincerity, humanity, courage, and strictness.<sup>102</sup>

Sun Tzu, *The Art of War*

Martin van Creveld has in his famous book; *Command in War*, focused his work on command and encompasses control as an integral part of command.<sup>103</sup> He defines command as a function that has to be exercised, more or less continuously, if the army is to exist and to operate.<sup>104</sup> This is, however, for this thesis too broad a definition.

NATO's Land Tactical Doctrine has a more precise definition of command as the process by which the commander impresses his will and intentions on his subordinates. It encompasses

the authority and responsibility of deploying forces to fulfill his mission. Control is the process through which the commander, assisted by his staff, organizes, directs and coordinates the activities of the forces allocated.<sup>105</sup> These definitions link command and control directly to the commander and his staff and give a basis for defining roles for the commander and his staff.

NATO's Land Tactical Doctrine expresses the role of the commander in terms of a number of functions; (1) knowing the higher commanders intent; (2) assessing the situation; (3) making decisions; (4) assigning missions; (5) allocating resources; (6) directing forces; (7) sustaining forces; (8) motivating forces; and (9) providing leadership.<sup>106</sup> The balance between these functions vary pending the situation, forces available and the level of command.

The staff exists to provide advice and assistance to the commander and to provide support to subordinate commanders. The staff's functions are to; (1) gather information; (2) appraise; anticipate; (3) inform; (4) recommend; (5) issue directions on behalf of the commander; (6) supervise; and (7) coordinate.<sup>107</sup>

How does then maneuver warfare influence the functions and execution of command?

#### Command by Influence

Most maneuver warfare theorists like Liddell Hart,<sup>108</sup> Fuller, Simpkin,<sup>109</sup> Edward N. Luttwak, William S. Lind,<sup>110</sup> van Creveld,<sup>111</sup> and John F. Antal<sup>112</sup> strongly advocate a decentralized command concept. This is a command concept based on the German *Auftragstaktik* tradition, that was institutionalized in the German Army from the time of General Helmut Karl Bernhard von Moltke in the 1850s. He stated that commanders must judge the situation for themselves and must know how to act independently in consonance with the general intention. When the enemy is not yet deployed, taking the initiative is of the utmost value. In this case one must not hesitate to commence the battle, but one should always keep the battle objective consistent with available forces.<sup>113</sup>

This *Auftragstaktik* tradition has by a number of theorists been renamed *directive control*. Simpkin has in fact used the German 1933 *Truppenführung* (doctrine) definition of command (*Auftragstaktik*) to explain his concept for directive control. This definition of command is based on task and situation. The task lays down the aim to be achieved, which the commander charged with achieving it must keep in the forefront of his mind. Task and situation give rise to the mission. The mission must be a clearly defined aim to be pursued with all one's power. The commander must leave his subordinates freedom of action, to the extent that doing so does not imperil his intention.<sup>114</sup>

The word *Auftragstaktik*<sup>115</sup> is, however, relative new and was first used by the Germans after the Second World War in order to describe to Americans the *Wehrmacht's* leadership philosophy.<sup>116</sup> As such, Simpkin and other theorists have, when attempting to describe a command method, mixed this with a leadership philosophy. David J. Lemelin describes this leadership philosophy (*Auftragstaktik*) as the overarching, holistic approach to leader development and battlefield decision making taken by the German school.<sup>117</sup> He also states that within this leadership philosophy it is possible to slide on a scale describing different methods of command. Emphasis on unity of effort (centralization) is at one end and emphasis on subordinate initiative (decentralization) on the other. All command and control methods would be points along this scale.<sup>118</sup> He does, however, conclude that a command methodology based on *Auftragstaktik* must always be conducted well over on the subordinate initiative side of the centralization scale.<sup>119</sup> *Auftragstaktik* can as such be seen as a leadership philosophy that is a prerequisite for being able to execute a decentralized command method.

Thomas J Czerwinski has, based on Martin van Creveld's book; *Command in War*, called the decentralized command method that evolves from *Auftragstaktik*-- Command-by-influence.<sup>120</sup> As the term suggests, the focus of this command method is to influence all of the forces constantly through the commander's intent for the operation. Command-by-influence is a

command method that *distributes* uncertainties that are caused by friction, an ever-changing situation, and other systems based on non-linear dynamics.<sup>121</sup>

Czerwinski also defines two other command methods--Command-by-direction and Command-by-plan.<sup>122</sup> While command-by-influence distributes uncertainty, command-by-plan centralizes uncertainty, and command-by-direction prioritizes uncertainty.<sup>123</sup> A command method that distributes uncertainty trusts subordinate commanders to be more capable of utilizing windows of opportunity or solving on the spot problems than higher commanders.

It is, however, important to note that there are powerful lobbies that have different approaches to command and control. The U.S. Army's Force XXI concept does for instance call for command-by-direction concept,<sup>124</sup> while current U.S. joint doctrine tends to be written in the context of command-by-plan method.<sup>125</sup> These are examples that show that while talking about maneuver warfare and mission type orders, something else is in fact being done. This is not only an American phenomena, but also a problem within the Norwegian Armed Forces. It shows that it might be more difficult to implement a maneuverist approach than expected, or that there in fact is a lack of will for implementing a new command method. According to John P. Kotter, both reasons are based on organizational culture and are typical for change in any organization.<sup>126</sup> A change from one command method to another will thus require certain support or prerequisites.

#### Prerequisites

It is generally accepted that command-by-influence is fundamental for conducting operations based on maneuver warfare theory. It is, however, to a lesser degree understood that a leadership style like the *Auftragstaktik* is a prerequisite for establishing the *trust* that is required for all leaders to execute operations in a maneuveristic manner. Without trust it is not possible for all leaders when facing an unexpected situation to think--when my boss gave me my mission, he cannot have anticipated this situation. Therefore, I shall disregard my mission and act within my boss' intent.<sup>127</sup>

Disregarding the mission and being without any guidance except the intent, makes all decisions risky. Such decisions not only go against the given missions, but also have to encompass unforeseen situations that leaders and their soldiers are not prepared to meet. In order for these decisions to be the right ones, it is necessary to train on such decision making. This can only be done in an environment where it is expectable to fail during training in order to learn from one's faults. The only unacceptable options during such training is to not show initiative and not being able to explain one's decisions, and as such not being able to learn from experiences.<sup>128</sup>

An environment with such loose control is in many ways culturally contradictory to traditional military order, and it required a number of prerequisites in order to function satisfactory. Franze Uhle-Wettler has listed such prerequisites in his article; "Auftragstaktik: Mission Orders and the German Experience."<sup>129</sup> His prerequisites for getting *Auftragstaktik* to function are; (1) sound professionalism; (2) high self-confidence; (3) superiors that are highly supportive to unorthodox solutions; and (4) a focus on supporting and helping sub-ordinates, not inspection and evaluating them.<sup>130</sup> Only through significant freedom to develop and with significant support and guidance is it possible to develop the trust that is required for being able to execute operations based on command-by-influence.

#### Communication

Communication is fundamental for any military organization to function. As such, it is strange to find that nor the U.S, United Kingdom (K), Norway, or NATO has a military definition of the term. All definitions focus on communications, which is the technological side of communication. NATO's definition in this area covers communications and information systems as an assembly of equipment, methods and procedures, and if necessary personnel, organized so as to accomplish specific information conveyance and processing functions.<sup>131</sup>

Communication is, however, more fundamental than that. Communication is the process of sharing ideas, information, and messages with others in a particular time and place.

Communication includes writing and talking, as well as nonverbal communication, such as facial expressions, body language, or gestures, visual communication, and electronic communication.<sup>132</sup>

Communication is about sharing human perception. Ideally, two or more persons should have the exact same perception. This is, however, difficult if not impossible to achieve due to perceptions being influenced by the individuals earlier experiences or paradigms.

Command-by-influence requires that all leaders understand the commander's intent for the operations. Without this common understanding, there will be no focus of effort and the effects that this command method should generate, will never appear. The all-important *trust* between all levels of command will disappear without a mutual feeling of common understanding. Dysfunctional communication is, however, a common event that has to be fought in order to achieve a common understanding, trust and focus.

Like in all communication, it is self evident that common understanding can only be achieved through a commonly understood language. Precise terms in order to communicate specific military problems are, however, lacking in many languages. English lacks for instance good terms that describe essential German military terms like; *Schwerpunkt*, *Aufrollen*, *Keil*, *Kessel*, and *Vernichtungsgedanke*.<sup>133</sup> Without such terms, it becomes difficult to explain how mobile warfare and maneuver warfare functions. This is one of the reasons that so many English language books and articles on mobile and maneuver warfare still use German terms and expressions. This is of cause further complicated by most readers not having a good grasp of German, resulting in these German terms being used out of context and thus becoming even more difficult to understand.

The direct translation of German terms like *Auftragstaktik* into mission-order-tactics has further reduced the original value of the term, since mission-type orders and mission-type tactics

have been used in manuals that does not describe maneuver warfare, but the opposite; positional attrition warfare.<sup>134</sup> By using terms in this way and often without defining them, communication becomes increasingly difficult.

The Norwegian Armed Forces uses English at all levels of command where it is anticipated that allied forces may be integrated during future operations. In the Army, this may be down to company level. The problems concerning lack of good English terms to describe relevant military problems within a maneuver warfare concept is thus also very relevant for the Norwegian Army. In addition, the Norwegian language lacks some military terms that exist in English. This is, however, partly compensated through Norwegian having some of the German military terms that the English language still lacks. The basic problem concerning communication does, however, exist within the Norwegian military as it does in English speaking countries.

Norway has a mobilization land force and only a small professional officer cadre that becomes the leadership of the total land force. This calls for communication between professionals and reserve officers with less experience in the use of purely military terms. As such, it becomes very important to use military terms that are precise and well understood. In order to further avoid dysfunctional communication, due to reserved officers staying in the reserve for up to thirty-five years after their basic military education, it becomes important to avoid changing terms frequently.

The human brain does not comprehend words and terms as easily as graphics and pictures. This is the reason why the first forms of writing were pictographic, with symbols representing objects.<sup>135</sup> This only show what most officers have experienced-- maps with military graphics are a lot easier and quicker to understand than written orders. Thus, dysfunctional communication can be avoided by using maps, graphics, sketches, and pictures.<sup>136</sup>

Personalities, the human dimension and situations heavily influence the way communication is conducted in the field. Erich von Manstein has captured this in his excellent book: *Lost Victories*. He states that “Whenever things are going well, news usually finds its way back quickly enough. If, on the other hand, the attack gets stuck, a blanket of silence descends on the front, either because communications have been cut or those concerned prefer to hang on till they have something encouraging to report.”<sup>137</sup> Even in the German Army with an Auftragstaktik leadership style, it was difficult to communicate failure or lack of progress. Such loss of face is culturally dependent and should be acknowledged in all coalition operations. Such potential for dysfunctional communication does not only limit itself between different cultures, nations and services, but it also exists between genders. Kathleen Kelley Reardon has in her book; *They don't Get it, do they? Communications in the Workplace--Closing the Gap Between Women and Men*, lifted a veil from this taboo issue. There is a significant potential for dysfunctional communication between women and men due to our different paradigms, and this is an issue that must be taken into consideration in a mixed gender military organization.<sup>138</sup>

Good communication is eventually about knowing each other. A common language, procedures, information systems are only tools that can support personal communication. It is only through such personal integration that trust develops and significant influence can be achieved. It must also be acknowledged that such influence to large extent come from appearance and body language. This is the part of communication that only to a small extent can be communicated through electronic means. Rommel summed this up by saying that the Commander must have contact with his men. He must be capable of feeling and thinking with them. The soldier must have confidence in him. There is one cardinal principle which must always be remembered: one must never make a show of false emotions to one's men. The ordinary soldier has a surprisingly good nose for what is true and what is false.<sup>139</sup>

## Commander and Staff

A commander and his staff must operate and communicate within an environment with friction. Manuel de Landa has in his book; *War in the Age of Intelligent Machines*, stated that, "In the case of tactical command networks, friction appears as 'noisy data.' Not only information circulates in the circuits of command networks, but also the uncertainty produced by the fog of war. The most successful command systems in history have been the ones that manage to 'dissipate' uncertainty throughout a hierarchy."<sup>140</sup> This friction creates a state of uncertainty that can only be countered through the acceptance of uncertainty or with additional information.

According to Martin van Creveld, when confronted with a task, and having less information available than is needed to perform the task, an organization may react in either of two ways. One is to increase the information-processing capacity, the other to design the organization, and indeed the task itself, in such a way as to enable it to operate on a basis of less information. The former will approach will lead to the multiplication of communication channels (vertical, horizontal, or both) and to an increase in the size and complexity of the central directing organ; the latter, either to a drastic simplification of the organization so as to enable it to operate with less information or else to the division of the task into various parts and to the establishment of forces capable of dealing with each of these parts separately on a semi-independent basis.<sup>141</sup>

Martin van Creveld states that the first two approaches are inadequate to meet any technological development and thus stand in danger of becoming self-defeating. Based on the third method suggests that a functional organization require; (a) the need for decision thresholds to be fixed as far down the hierarchy as possible, and for freedom of action at the bottom of the military structure; (b) the need for an organization that will make such low-decisions thresholds possible by providing self-contained units at a fairly low level; (c) the need for a regular reporting and information-transmission system working both from the top down and from the bottom-up; (d) the need for the active search of information by headquarters in order to supplement the

information routinely sent to it by the units at its command; and (e) the need to maintain an informal, as well as a formal, network of communications inside the organization.<sup>142</sup>

As mentioned earlier in this thesis, this calls for a decentralized command method and flexible combined arms units at a low level of command. Simpkin supports this concept and states that for maneuver forces, "Headquarters must be small, simple and supple, designed round a minimum nucleus of commander and key staff officers."<sup>143</sup> This is also Fuller's view. "Maneuver forces are to have a general of high initiative with a small operational staff, while occupying forces mainly require an administrator and a highly organized administrative staff to control them."<sup>144</sup>

As indicated by Fuller, supporting forces, like logistics, combat support and rear area security forces, may benefit from having a more centralized command method. Just in time logistics, movement control and communications management are all good examples of functions that require detailed orchestration.

Active search for information in order to keep staffs and commanders in touch with the local situation is of vital importance. Martin van Creveld states the requirement for an aides-de-camp system of officers that report their evaluations from different locations on the battlefield and from different formations in order to produce a more balanced picture of the overall situation. He calls this the directed telescope.<sup>145</sup> Besides broadening the overall situation awareness, such staff officers may also convey intent and direct changes to subordinate commanders.<sup>146</sup> The directed telescope this way counteract the natural tendency of any decentralized organization to degenerate into a set of semi-independent units where decision making becomes a bargaining process.<sup>147</sup> This is also a cornerstone in Fuller's view of command and control. He suggested, again following Napoleon, that a commander could keep tight control over military operations by employing a number of aides-de-camp who could act as his eyes and ears.<sup>148</sup> Also Gary B. Griffin has in his comprehensive historical study; "The Directed Telescope: A Traditional

Element of Effective Command," concluded that, "The history of the directed telescope system has not always been positive. The negative aspects of the system were, however, more often the exceptions than the rule. Generally speaking, the value of the system far outweighed any problems associated with its sensitive operations."<sup>149</sup>

Nevertheless, it is interesting to note that he does not recommend the reinstitution of this system into the U.S. Army. This is due to among other reasons that today's functional staff officers, compared to traditional general staff officers, will find it exceedingly difficult to relay important tactical and operational information and to monitor the rapidly changing battlefield.<sup>150</sup> This is a view that is not sheared by the Norwegian Army, who has a system of liaison officers from battalion level and above. There is, however, a fine balance to how such a system may be used. To enable the directed telescope to carry out its proper function, care must be taken to design it in such a way as neither to intimidate subordinate commanders nor to become an object of their contempt.<sup>151</sup>

Simpkin states ironically that an order is a good basis for discussion.<sup>152</sup> He states this to emphasize the importance of communication between the different levels of command beside the established reporting system and the directed telescope. Both commanders and staffs must communicate two levels down and two levels up to ensure a common situation picture and unity of intent.

However, type of communication will not compensate for forward presence on the battlefield. According to Chris Bellamy in his book; *The Future of Land Warfare*, the future commander will have access to information about the enemy's location, strength and weapons, but the enemy will know the same about him. Therefore, surprise and deception are as critical as ever, and feel for the battle--fingerspitzengefühl--is as critical as ever. To keep hold of the pulse of the battle the commander must be forward.<sup>153</sup>

Forward presence on the battlefield also has a moral dimension. Motivating forces is one of the vital command functions, and human interaction and presence can not be compensated by public relations etc. Such forward presence is, however, on the modern battlefield risky. In order to ensure continuity of command it becomes important to divide the staff. The commander can thus travel rapidly from unit to unit with a very small staff element while the remaining part of the staff under the direction of the chief of staff operates from a different location. Modern communications technology supports such division of the staff. Nevertheless, vital human interaction within the staff will suffer if such separation becomes permanent. A commander and his/her staff can only function optimally if there is a good human interaction. Such interaction also includes encouraging professional and personal diversity within the staff in order to ensure objectivity and completeness in planning and execution.

#### Planning, Decision Making and Orders

Reginald Bretnor has in his book *Decisive Warfare*, described the aim of military planning. In war, there can be one criteria and one only: maximum result from minimal investment. However, as the phrase minimal investment can be appraised only in terms of the result produced, we must not fall into the error of expecting miracles from inadequate force and allowing for considerations of economy--rather than military relevance--to dictate our strength either quantitatively or qualitatively.<sup>154</sup>

Bretnor's result is what the commander wants to achieve, his intention, with the operation. In NATO and in the Norwegian Armed Forces the commander's intent statement is the commander's personal expression of why an operation is being conducted and what should be achieved. The intent is an expansion and expression of how a mission is to unfold. It is a clear and concise statement of a mission's overall purpose, the resulting end-state, and any essential information on how to get to that end-state.<sup>155</sup> The endstate being the stated political or military situation which need to exist when an operation has been terminated on favorable terms.<sup>156</sup>

The endstate signals a change in situation from the initiation of the operation to its conclusion. This change is the effect the commander's wants achieved as a result of the use of force. How this is achieved is of lesser importance as long as units do not work contradictory to the achievement of the end-state. Unit commanders understanding of each other's mission and intent is thus of vital importance. This understanding must be of such a nature that their respective actions support each other and create a synergy effect that is greater than the sum of individual actions. This calls for necessary planning, orders and coordination.

Since the orders are the basis for the execution, it becomes of vital importance that they contain as a minimum the intent, the different units tasks, the allocation of resources and any constraints.<sup>157</sup> It must further be a balance between "need to know" and "nice to know" information. The latter not only slows the execution process, but it has a tendency of covering important information from the information that is not essential for the execution. The order should also be easily understood and a visualization of the operation. Maps and graphics with precise terms and expressions are here of far greater value than pages of writing.

Focus on need to know information also gives subordinate commanders the necessary freedom for initiative and creativity that enables them to exploit different courses of action. This creates for the adversary an unpredictable situation with good possibilities for deception and surprise. This has in itself a great value since it dislocates enemy capabilities, moral and forces. Planning must thus take into account that the effect is not only own power projected against the enemy, but also the effects such uncertainty has on the enemy commander's and his troops' moral.

Michael E. Porter has made the value chain famous in business. In the value chain, Porter focuses on the effects that are created by a number of different products. These products are again a result of input and processes.<sup>158</sup> The model represented by the value chain can be used as a planning tool. The effect can be viewed as the intent, where the purpose and the end-

state are the essential elements. The third part of the intent, the method, will on the other hand focus on the interrelationship between the different products and how they in different configurations will create different effects. Effects are thus dependent on product patterns. The aim of planning is thus to find those product patterns that create the best effects for the specific situation.

In this setting, a product is a critical vulnerability that has been successfully engaged or influenced by own forces. It is either taken out permanently; defeated or destroyed, or rendered irrelevant for the duration of the battle where it could have influenced the outcome; neutralized or dislocated.

Engagement of critical vulnerabilities can according to Liddell Hart be done by; (1) dispersed advance with concentrated single aim, i.e. against one objective; (2) dispersed advance with concentrated serial aim, i.e. against successive objectives; and (3) dispersed advance with distributed aim, i.e. against a number of objectives simultaneously.<sup>159</sup> The first approach is the traditional army way of massing combat power against a (decisive) point and achieving one product.<sup>160</sup> The second and third approaches have more in common with the use of modern air power, creating multiple products in different patterns.<sup>161</sup> This does, however, not mean that the two latter approaches are unfeasible for land forces. Simultaneous attacks can for instance be conducted by attacking on a broad front, through infiltration or by using maneuver and deep operations forces at the same time. Sequential operations can on the other hand be done by going deep on one axis, the Soviet approach,<sup>162</sup> or by going deep on multiple axis in order to achieve envelopment, the traditional German approach.<sup>163</sup>

Envelopment is a well-defined approach for creating a specific pattern of products. It may thus be defined as a method in the method part of the intent. The other above mentioned approaches are, however, less well-defined, and will not give a good guidance as a method for the creation of a specific product pattern. Since different product patterns create different effects, it

becomes essential to be able to convey the right method in order to focus all subunits efforts towards one purpose and endstate. The more dispersed the operation becomes, the more important the general understanding of the method becomes. A good method will reduce the requirement for details in the order and the need for coordination. This will strengthen the focus on the intent and reduce the time required for planning.

Effects will also be created by deception; dislocating enemy forces, and thus reducing his relevant combat power and ability to react to our pursuit of products. A part of the intent, a second method, must thus focus on deception measures in order to reduce the value of the enemy's forces.

Using Porter's value chain as a model, planning must focus on both employing deception operations to weaken critical vulnerabilities or create them, and at the same time attacking these according to a method or pattern. Combining the two methods will provide synergy effect that reduces the value of traditional combat power ratios, and enables smaller and swifter forces to achieve significant victories on the battlefield.

Planning such operations is very challenging for two reasons. First, this is a fight for time. Once formations and units are committed there will be little time for planning and the execution must be done at a high tempo. Second, the planning is in fact for two separate types of operations that have to be well-coordinated. This is first the deception operation and secondly the attack on the critical vulnerabilities themselves. The deception portion of the plan has to focus on increasing the friction the enemy has to put up with, while the enemy commander believes that it in fact is being reduced. For the attack portion of the plan, the focus must be on reducing own friction while the enemy's friction increases. A key factor in the ability of a command system to overcome friction thus becomes planning. Planning based on a thorough analysis of the situation before a battle, should enable commanders to anticipate many of problems presented by friction. No matter how detailed the plan, however, it is virtually certain that friction will cause it to

change when the fighting begins. Commanders must be prepared to make changes in plans with less information than they would like.<sup>164</sup>

The Norwegian Armed Forces uses three different types of methods for problem-solving and establishing a basis for decision-making. These methods are; (1) intuitive problem-solving; (2) creative thinking and problem-solving; and (3) analytic problemsolving.<sup>165</sup> For operational planning the analytic problem-solving process is more compressed and requires less time than the U.S. Army Military Decision-Making Process (MDMP). Based on personal experience, it also creates courses of action that focus less on force protection and generally are more risk and high payoff focused. As a model, the analytic problem-solving process can encompass the creative thinking and problem-solving method. This reduces the time spent on creating courses of action, and the focus becomes more on testing the feasibility of some of the courses of action. Due to development of radically different courses of action and using less time, this method is good in a time-constrained environment. Finally, there is the *intuitive* method that focuses on one course of action that comes out as a vision from the commander, his chief of staff or from the S-3/G-3. The most significant advantages of intuitive decision-making are speed, creativity, the tolerance of uncertainty and the ability to visualize the problem and its solution.<sup>166</sup> The intuitive method should thus be excellent in a time-constrained environment and ideally suit the execution of operations based on maneuver warfare theory. However, there are prerequisites and risks connected to the intuitive problemsolving and decision-making method. These issues will be described in chapter 5.

Orders for the execution of operations should be short, precise, visualize the operation, and give subordinate commanders freedom of execution. However, in many cases there will be a requirement to establish certain conditions on the battlefield that are prerequisites or assumptions for the success of the entire operation. In these cases, the commander must issue the necessary tasks, even if required to a unit two levels down the chain of command. This must not be viewed

as micro management, but instead as setting conditions that ensures freedom of action for the remainder of the force. This follows the German tradition where many orders in fact contain tasking two levels down.<sup>167</sup>

Short orders require a combination of a well-trained staff and standard operating procedures (SOP). SOPs must be used as tools and not become so comprehensive that they replace common sense and judgment. As computer-systems evolve, SOPs will become part of the command, control and communications system. Efforts must, however, be taken to ensure that they stay as supportive tools and not start to drive the staff by unnecessary procedures and control measures. According to Simpkin, "Their purpose is not to restrict human judgement, but to free it from the tasks only it can perform; not to exclude it from the primary control loop, but to sustain it there."<sup>168</sup>

### Conclusion

Maneuver warfare can only be achieved by using command-by-influence as the command method. However, this method of command requires a leadership style that facilitates trust within the organization. Only by having such thrust is it possible for officers, NCOs and soldiers to really be put in challenging situations and learn through trials and failure.

A prerequisite for such trust and focus on the commander's intent, is good communication. Officers must have a training that ensures a common understanding of military terms, symbols and orders.

The commander and his staff must be able to operate with limited information. This allows for smaller staffs that better can secure vital human interaction and common understanding during the decision making process. The use of liaison officers based on the directed telescope concept will contribute to a better understanding of the situation on the battlefield. However, this can not compensate for the importance of the commander's forward presence on the battlefield.

Planning and execution of operations must focus on the effects that own forces inflict on the enemy. These effects must be guided by the intent--the purpose, method, and end-state of the operation. These effects must also encompass deception measures that reduce the enemy's ability to counter our operations. Such operations will be planned and executed in a time constrained environment where an intuitive decision-making process will have advantages over the analytic decision-making process.

Planning and execution based on such intuitive decision-making will require a well-trained staff with good SOPs that allow for orders to be short and precise. The execution of these orders must, however, also be followed up two levels up and down the chain of command to ensure execution according to the intent.

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<sup>1</sup>Basil H. Liddell Hart, *Strategy*, 212.

<sup>2</sup>Norwegian Army Doctrine, U. S. Marine Corps, "MCDP 1--Warfighting," 73.

<sup>3</sup>NATO. *NATO Glossary of Terms and Definitions--AAP-6 (V)*."

<sup>4</sup>*Ibid.*

<sup>5</sup>Robert R. Leonhard, *Fighting by Minutes*, 28.

<sup>6</sup>Carl von Clausewitz, *On War*, 138.

<sup>7</sup>Richard E. Simpkin, *Race to the Swift*, 106.

<sup>8</sup>Barry D. Watts, *Clausewitzian Friction and Future War*, 130.

<sup>9</sup> Clausewitz, 132, 135, 117.

<sup>10</sup>U.K. MoD, *Interim Edition 1.0 of the UK Joint Glossary of Terms and Definitions* (Supplement to AAP-6), 10.

<sup>11</sup> Watts, 3.

<sup>12</sup> Clausewitz, 141.

<sup>13</sup>*Ibid.*, 136

<sup>14</sup>*Ibid.*, 137.

<sup>15</sup>John Boyd, *Destruction and Creation*.

<sup>16</sup>Watts, 108.

<sup>17</sup>*Ibid.*, 106.

<sup>18</sup>James Dewar, James Gillogly, and Mario Juncosa, *Non-Monotonicity, Chaos, and Combat Models*, vi.

<sup>19</sup>Barry D. Watts, *Clausewitzian Friction and Future War*, 120.

<sup>20</sup>*Ibid.*, 120.

<sup>21</sup>Hart, 13.

<sup>22</sup>Clausewitz, 720.

<sup>23</sup>NATO, "NATO Glossary of Terms and Definitions--AAP-6 (V)."

<sup>24</sup>Clausewitz, 748.

<sup>25</sup>NATO, "Allied Joint Doctrine--AJP-01(A)," 3-3.

<sup>26</sup>NATO, "NATO Glossary of Terms and Definitions--AAP-6 (V)."

<sup>27</sup>NATO, "Allied Joint Doctrine--AJP-01(A)," 3-3.

<sup>28</sup>*Ibid.*, 3-3.

<sup>29</sup>NATO, "Land Forces Tactical Doctrine--Ratification Draft," XXV.

<sup>30</sup>Headquarters Department of the Army, FM 100-5, *Operations*, Draft--June 1993, 6-7.

<sup>31</sup>NATO, "Allied Joint Doctrine--AJP-01(A)," 3-3.

<sup>32</sup>J. J. A. Wallace, "Maneuver Theory in Operations Other than War," from *Military Power--Land Warfare in Theory and Practice*, edited by Brian Holden Reid, 215.

<sup>33</sup>Hart, 327.

<sup>34</sup>*Ibid.*, 5.

<sup>35</sup>Wallace, 209.

<sup>36</sup>Hart, 5.

<sup>37</sup>Leonhard, *The Principles of War for the Information Age*, 64.

- <sup>38</sup>Ibid., 64-65.
- <sup>39</sup>Edward N. Luttwak, *Strategy--The Logic of War and Peace*, 27-31.
- <sup>40</sup>Leonhard, *The Art of Maneuver Warfare*, 304-309.
- <sup>41</sup>Hart, 333.
- <sup>42</sup>Ibid.
- <sup>43</sup>Ibid., 3-11.
- <sup>44</sup>Leonhard, *Fighting by Minutes*, 94.
- <sup>45</sup>Hart, 333.
- <sup>46</sup>Ardant du Picq, *Battle Studies*, 64.
- <sup>47</sup>Hart, 327.
- <sup>48</sup>Sun Tzu, *The Art of War*, 91.
- <sup>49</sup>Simpkin, 160.
- <sup>50</sup>Hart, 333.
- <sup>51</sup>UK MoD, "Joint Warfare Publication 0-01.1--UK Joint Glossary of Terms and Definitions," 7.
- <sup>52</sup>Hart, 333.
- <sup>53</sup>Dr. Joe Strange, "Perspectives on Warfighting, No. 4, 2d ed., Centers of Gravity & Critical Vulnerabilities," 1996, ix.
- <sup>54</sup>Ibid., ix.
- <sup>55</sup>Ibid.
- <sup>56</sup>Tzu, Sun, *The Art of War*, 134.
- <sup>57</sup>Webster, *Webster's New Explorer Dictionary*, 499.
- <sup>58</sup>Leonhard, *The Art of Maneuver Warfare*, 82.
- <sup>59</sup>Ibid., 86.
- <sup>60</sup>NATO, "Land Forces Tactical Doctrine--Ratification Draft," XXVI.

<sup>61</sup>Leonhard, *Fighting by Minutes*, 69.

<sup>62</sup>Simpkin, 106.

<sup>63</sup>David S. Fadok, *John Boyd and John Warden: Air Power's Quest for Strategic Paralysis*, 17.

<sup>64</sup>William S. Lind, *Maneuver Warfare Handbook*, 5.

<sup>65</sup>Chuck Spinney, *Genghis John*, 4.

<sup>66</sup>Boyd, 4–6.

<sup>67</sup>*Ibid.*, 6.

<sup>68</sup>William S. Lind, *Military Doctrine, Force Structure, and the Defense Decision Making Process*, 22.

<sup>69</sup>Boyd, Slide 10.

<sup>70</sup>Joel Arthur Barker, *Paradigms*, 31.

<sup>71</sup>Fadok, 24.

<sup>72</sup>Mao Tse-Tung, *Mao Tze-Tung on Guerrilla Warfare*, 23.

<sup>73</sup>Linda P. Beckerman, *The Non-Linear Dynamics of War*, 3.

<sup>74</sup>*Ibid.*, 4.

<sup>75</sup>*Ibid.*, 7.

<sup>76</sup>*Ibid.*

<sup>77</sup>Boyd, *A Discourse on Winning and Loosing*.

<sup>78</sup>Luttwak, *The American Style of Warfare and the Military Balance*, 57.

<sup>79</sup>Martin van Creveld, *Air Power and Maneuver Warfare*, 5.

<sup>80</sup>Norwegian Army, *Taktisk doktrine for Hæren*, 14.

<sup>81</sup>Creveld, *The Transformation of War*, 208.

<sup>82</sup>John J. Mearsheimer, *Precision-guided Munitions and Conventional Deterrence*, 75.

<sup>83</sup>Luttwak, *The American Style of Warfare and the Military Balance*, 59.

- <sup>84</sup>Stephen Peter Rosen, *Winning the Next War*, 244.
- <sup>85</sup>Steven Canby, *NATO: Reassessing the Conventional Wisdoms*, 168.
- <sup>86</sup>J. F. C. Fuller, *Machine Warfare*, 56-59.
- <sup>87</sup>Leonhard, *The Art of Maneuver*, 97.
- <sup>88</sup>Fuller, 17.
- <sup>89</sup>Simpkin, 17.
- <sup>90</sup>Luttwak, *Strategy, The Logic of War and Peace*, 29.
- <sup>91</sup>Leonhard, *The Art of Maneuver*, 307.
- <sup>92</sup>Luttwak, *Strategy, The Logic of War and Peace*, 29.
- <sup>93</sup>Leonhard, *The Art of Maneuver*, 96.
- <sup>94</sup>*Ibid.*, 255.
- <sup>95</sup>Creveld, *Air Power and Maneuver Warfare*, 6.
- <sup>96</sup>*Ibid.*, 3.
- <sup>97</sup>F. O. Mikcshe, *Attacks*, 55, 131.
- <sup>98</sup>Simpkin, 134.
- <sup>99</sup>Creveld, *Air Power and Maneuver Warfare*, 15.
- <sup>100</sup>Simpkin, *Human Factors in Mechanized Warfare*, 16.
- <sup>101</sup>Creveld, *Air Power and Maneuver Warfare*, 6.
- <sup>102</sup>Tzu, 134.
- <sup>103</sup>Creveld, *Command on War*, 1.
- <sup>104</sup>*Ibid.*, 5.
- <sup>105</sup>NATO, "Land Force Tactical Doctrine--ATP-35 (B)," 2-1.
- <sup>106</sup>*Ibid.*, 2-2.
- <sup>107</sup>*Ibid.*, 2-3.

<sup>108</sup>Hart, *The 'Man-in-the-Dark' Theory of Infantry Tactics and the 'Expanding Torrent' System of Attack*, 15.

<sup>109</sup>Simpkin, 12.

<sup>110</sup>Lind, *Maneuver Warfare Handbook*, 14.

<sup>111</sup>Crevelld, *Command in War*, 270.

<sup>112</sup>John J Antal, "Thoughts About Maneuver Warfare," *Maneuver Warfare; An Anthology*, edited by Hooker, Richard D, 72.

<sup>113</sup>Moltke, *Moltke on the Art of War*, 131.

<sup>114</sup>Simpkin, 228.

<sup>115</sup>David J. Lemelin, *Command and Control Methodology: A Sliding Scale of Centralization*, 53.

<sup>116</sup>Franz Uhle-Wettler, "Auftragstaktik: Mission Orders and the German Experience," *Maneuver Warfare: An Anthology*, edited by Hooker, Richard D., 238.

<sup>117</sup>Lemelin, 54.

<sup>118</sup>*Ibid.*, 3, 4.

<sup>119</sup>*Ibid.*, 55.

<sup>120</sup>Thomas J. Czerwinski, *Command and Control at a Crossroads*, 3.

<sup>121</sup>*Ibid.*, 4

<sup>122</sup>*Ibid.*, 2, 3.

<sup>123</sup>*Ibid.*, 2, 3.

<sup>124</sup>Antal, 68.

<sup>125</sup>Thomas J. Czerwinski, *Command and Control at a Crossroads*, 2, 8.

<sup>126</sup>John J. Kotter, *Leading Change*, 157.

<sup>127</sup>Uhle-Wettler, 243.

<sup>128</sup>Richard D. Hooker, "Implementing Maneuver Warfare," *Maneuver Warfare; An Anthology*, edited by Hooker, Richard D., 227.

<sup>129</sup>Uhle-Wettler, 236.

<sup>130</sup>Ibid., 243-244.

<sup>131</sup>NATO, "NATO Glossary of Terms and Definitions--AAP-6 (V)".

<sup>132</sup>Microsoft, *Encarta*.

<sup>133</sup>Michael Elliott-Bateman, "Vocabulary: The Second Problem of Military Reform-II," *Tactics*, 329.

<sup>134</sup>Ibid., 330.

<sup>135</sup>Microsoft, *Encarta: Communication*.

<sup>136</sup>Thomas J. Czerwinski, *Command and Control at the Crossroads*, 125.

<sup>137</sup>Erich von Manstein, "Lost Victories," 48.

<sup>138</sup>Kathleen Kelley Reardon, *They don't Get it, do they? Communications in the Workplace--Closing the Gap Between Women and Men*, ix.

<sup>139</sup>Hart, *The Rommel Papers*, 226.

<sup>140</sup>Manuel de Landa, *War in the Age of Intelligent Machines*, 60.

<sup>141</sup>Crevelld, *Command in War*, 269.

<sup>142</sup>Ibid., 270.

<sup>143</sup>Simpkin, 239.

<sup>144</sup>J. F. C. Fuller, *Armored Warfare*, 9.

<sup>145</sup>Crevelld, *Command in War*, 272.

<sup>146</sup>Gary B. Griffin, *The Directed Telescope: A Traditional Element of Effective Command*, 35.

<sup>147</sup>Crevelld, *Command in War*, 272.

<sup>148</sup>Brian Holden Reid, *J. F. C. Fuller: Military Thinker*, 124.

<sup>149</sup>Griffin, 36-37.

<sup>150</sup>Ibid., 37.

<sup>151</sup>Crevelld, *Command in War*, 272.

<sup>152</sup>Simpkin, 232.

- <sup>153</sup>Chris Bellamy, *The Future of Land Warfare*, 268.
- <sup>154</sup>Reginald Bretnor, *Decisive Warfare*, 187.
- <sup>155</sup>NATO, "Allied Joint Doctrine--AJP-01(A)," 3B-1.
- <sup>156</sup>NATO, "Allied Joint Operations--AJP-3," 3-13.
- <sup>157</sup>Simpkin, 231.
- <sup>158</sup>Michael E. Porter, *The Competitive Advantage of Nations*, 241.
- <sup>159</sup>Hart, *Strategy*, 333.
- <sup>160</sup>Headquarters Department of the Army, FM 100-5, *Operations* (June 1993), 2-4.
- <sup>161</sup>Jeffery R. Barnett, *Future War*, 8-13.
- <sup>162</sup>David M. Glantz, *Soviet Military Operational Art--In pursiut of Deep Battle*, 24.
- <sup>163</sup>Helmut von Moltke, *Moltke on the Art of War*, 55.
- <sup>164</sup>Clayton R. Newell, *The Framework of Operational Warfare*, 136.
- <sup>165</sup>Norwegian Defense Staff, *Stabshåndbok for Forsvaret*, 44-67.
- <sup>166</sup>Brad Bergstrand, *Situating the Estimate: Naturalistic Decision-Making as an Alternative to Analytical Decision-Making in the Canadian Forces*, 1.
- <sup>167</sup>Simpkin, 233.
- <sup>168</sup>*Ibid.*, 239.

## CHAPTER 5

### THE HUMAN AND MORAL DIMENSION

#### Introduction

Fredrick liked to say that three men behind the enemy were worth fifty in front of him.<sup>1</sup>

Ardant du Picq, *Battle Studies*

Maneuver warfare calls for a decentralized command system. Such a command-by-influence system can, however, only be achieved if there is sufficient trust within the organization. Such trust is based on feelings and emotions. This makes it important to have a leadership style that encompasses this human and moral dimension.

An understanding of the human and mental dimension is also vital for the comprehension of decision making, and especially for understanding intuitive decision making. This mental aspect also affects deception since this has to do with the enemy's decision making. The importance of this aspect was emphasized by Sun Tzu who stated that all warfare is based on deception.<sup>2</sup>

Finally, it is of vital importance to grasp how soldiers react in combat in order to weaken the enemy's organization and combat motivation, and to protect our own forces.

#### Emotional Intelligence

As a command method, command-by-influence has a very strong power of implementation once subordinates have grasped the intent of their mission. However, influence is not easily achieved. It has to do with communicating a vision and persuading soldiers to do actions that might endanger their lives. Command-by-influence thus has a significant interpersonal dimension. It is of great importance to note that, according to J. D. Mayer and P. Salovey in their article, "The Intelligence of Emotional Intelligence," studies on emotional intelligence indicate that people who are intellectually the brightest are often not the most

successful, either in business or their personal lives.<sup>3</sup> It is people who have a high emotional intelligence (EQ) that are best at communicating their vision. This shows that there is an emotional aspect that has to be taken into considerations concerning command and decision making.

Daniel Goleman has in his book, *Emotional Intelligence*, stated that "Emotions refers to feelings and its distinctive thoughts, psychological and biological states, and range of propensities to act. Examples are anger, sadness, fear, enjoyment, surprise, disgust, shame and love."<sup>4</sup> He also defines emotional intelligence, "As the ability to sense, understand, and effectively apply the power and acumen of emotions as a source of human energy, information, connection, and influence. It includes self-control, zeal and persistence, and the ability to motivate oneself."<sup>5</sup>

According to Robert K. Cooper and Ayman Sawaf in their book, *Executive EQ*, it is important to identify executives (commanders) that have a good EQ. They base this on research that suggests that a technical proficient executive or professional with a high EQ is someone who picks up--more readily, more deftly, and more quickly than others--the budding conflicts that need resolution, the team and organizational vulnerabilities that need addressing, the gaps to be leaped or filled, the hidden connections that spell opportunity, and the murky, mysterious interactions that seem most likely to provide golden--and profitable (successful).<sup>6</sup>

The study of emotional intelligence show how emotions effect behavior, influences decision making, motivates people to action, and impact their ability to interrelate. Research indicates that emotions play a much larger role than previously thought. This is especially the case, as the strong role of intuition in decision making is becoming more widely recognized and accepted.

While it has for a long time been widely held that rationality was the way of the executive or commander, it is now becoming clear that both the rational and the emotional parts

of the mind must be used together to get the best performance in an organization. Robert K.

Cooper and Ayman Sawaf explains this by stating that,

In truth, reasoning and decision making and emotion and feeling intersect in the brain. There is a collection of systems in the brain dedicated to the goal-oriented thinking process we call reasoning, and to the response selection we call decision making. This same collection of brain systems is also involved in emotion and feeling. Feeling and emotion have a powerful influence on reasoning. We see feeling as having a truly privileged status. They retain a primacy that pervades our mental life. Feelings have a say about how the rest of the brain and cognition go about their business. Their influence is immense.<sup>7</sup>

Since emotional intelligence plays such an important part in command and decision making, it becomes of vital importance to learn and adapt this part of the mental and human dimension. Emotional intelligence requires that we learn to acknowledge and value feelings--in ourselves and others--and that we appropriately respond to them, effectively applying the information and energy of emotions in our daily life and work.<sup>8</sup>

#### Intuition

Alvin and Heidi Toffler have in their book, *War and Anti-War*, stated that "The world has entered a Third Wave where slow, sequential, step-by-step engineering is replaced by simultaneous engineering."<sup>9</sup> Normal decision making thus has to be executed under a time constraint. Intuitive decision making is well-suited to meet such a time constraint.

Intuitive decision making is, however, not without its challenges. Anthony J. Stanford has in his book, *The Mind of Man--Models of Human Understanding*, explained this by stating that,

People can and do think about a new domain by making predictions from older more familiar domain. This can lead both to results which correspond to observable reality in the new domain, and to results which are at logger-heads to it. It is suggested that once an analogy becomes accepted as an appropriate way of looking at some new phenomenon, it progresses from conjecture through theory to belief. And the explorations which are enabled by analogical reasoning, and testing the "fit" of an analogy constitute a growth of real understanding.<sup>10</sup> This results in intuitive reasoning being informal, based on "feel" of a situation. In many ways it is quick and dirty, requiring less time than more analytic thinking.<sup>11</sup>

Commanders will in such a time-constraint environment also frequently be subjected to data constraints. Data constraints means that all of the pertinent facts may not be available to us when we are forced to make a judgement, or to attempt to understand things.<sup>12</sup> In addition, most military organizations will in such a time-constraint environment encounter skill constraints where only a few people are likely to be able to find an optimal solution given complex data.<sup>13</sup> In order to be able to make decisions at all, some simplifying procedures are called for, otherwise we spend all our time locked in our thoughts! Such procedures are called "heuristics," from the Greek word of "steersman."<sup>14</sup>

Intuition is based on heuristic thinking. Such thinking will lead to quick decisions. However, a number of situations, where solutions are sought through heuristic thinking, may lead to fallacy. If such heuristic thinking is done by a person with overconfidence in his or her abilities, this may lead to faulty decisions. This fallibility is a key aspect of human mentality that must be taken seriously in all decision making.<sup>15</sup>

Jennifer James has in her book, *Thinking in the Future Tense*, defined intuition as,

A combination of insight and imagination that was once attributed to spiritual communication. Mathematicians call it fuzzy logic, drawing conclusions from vague or subjective input. The mind becomes aware without the direct intervention of reasoning. Once you can imagine something you can begin the process of creating it.<sup>16</sup> She defines insight as a mental vision, one of the ways in which the mind escapes the limits of the obvious or the familiar. You are looking at things one way and suddenly you get an internal signal to look at them in a new way.<sup>17</sup> Imagination is the power of forming a mental image of something not present to the senses or not previously known or experienced.<sup>18</sup>

By connecting intuition to fuzzy logic, it is possible to explain intuition in a logical manner. It also becomes possible to create computer models for supporting intuitive decision making. Fuzzy logic is thus a form of logic used in some expert computer systems and other artificial-intelligence applications in which variables can have degrees of truthfulness or falsehood represented by a range of values between 1 (true) and 0 (false). With fuzzy logic, the outcome of an operation can be expressed as a probability rather than as a certainty.<sup>19</sup>

Fuzzy logic is today used in industry and are best employed as a complement to traditional embedded control systems, working in parallel with them to enhance their versatility, precision and reliability.<sup>20</sup> Thus, fuzzy logic is used to support the control of nonlinear processes.

War and friction are assessed as nonlinear processes. It is, however, a far step from using fuzzy logic in industrial control mechanisms controlling robots, to using computers to take over decision making on a very complex battlefield. So far, no computer system has been able to duplicate the basis for intuition that an experienced officer has used his/her whole lifetime to acquire. However, computers using programs based on nonlinear dynamics and fuzzy logic may be used to support commanders and their staffs by integrating these capacities into the command and control systems.

Marco Iansiti states in his book, *Technology Integration*, that in industry research in Japan and Korea projects rely intensely on experience to drive technology selection. The intuition of experienced project members is then confirmed through a rapid sequence of more limited, carefully selected experiments.<sup>21</sup> Applying such an approach on military planning and decision making, would imply that staffs to a large degree could be used to verify the commander's intuitive concept for fighting the battle instead of having to develop multiple courses of action. Using command and control systems with fuzzy logic capabilities and nonlinear dynamics modeling would support such an approach, and give the intuitive decision making more credibility. Decisions would thus be more based on a scientific verification than the traditional perception of "gut feelings" or "divine revelations."

It is in any case of vital importance to a commander to get a degree of verification of his or her intuitive vision ahead of it being put into action. Verification from the staff or subordinate commanders thus becomes essential. However, it requires a climate of trust within the organization to be able to tell the commander that in certain situation his intuition is flawed. It thus becomes essential that staff officers both identify such flaws and feel that they are able to

communicate the results of their findings. Trust is essential, but so is differences in personality in order to avoid conformity<sup>22</sup> and group thinking.<sup>23</sup>

### Deception

Sun Tzu stated that, "Nothing is more difficult than the art of maneuver. What is difficult about maneuver is to make the devious route the most direct and to turn misfortune to advantage."<sup>24</sup> During the Cold War, we forgot this old lesson and we came to rely upon physical destruction of the enemy and disregarded almost entirely the potential for psychological destruction (defeat).<sup>25</sup> Maneuver warfare calls for combining physical destruction and psychological defeat. The more psychological effects that can be focused on the enemy the less resources or less time is needed to destroy sufficient of the enemy's physical force to defeat him. One of the most important tools to achieve this is deception.

NATO has defined deception as those measures designed to mislead the enemy by manipulation, distortion, or falsification of evidence to induce him to react in a manner prejudicial to his interests.<sup>26</sup> In deception operations we strive to let the enemy see what we would like him to see and deny him the ability to see actions or preparations that will indicate our course of action. Modern technology does, however, provide surveillance that makes it difficult if not close to impossible to deny an enemy insight into preparations for operations. The aim must be to be able to let the enemy see our activity and at the same time create situations where the enemy deceives himself. Deception thus largely becomes self-deception.

Daniel Goleman has in his book, *Vital Lies, Simple Truths--The Psychology of Self-Deception*, stated that, "Perception is selection. Filtering out information is, in the main, for the good. But the very capacity of the brain to do so makes it vulnerable to skewing what is admitted to awareness, what rejected."<sup>27</sup> The most important contributor to deception is thus the enemy decision-maker. It is the enemy commander's perception of what is observed that that decides the enemy course of action. Since our ability to conceal our own preparations and actions will be

limited, the aim is to let the enemy draw a different conclusion based on his perception, than what we are intending to do.

A high tempo, dispersed forces, multiple lines of operations and forces that are dedicated to the conduct of deception operations will create a confusing picture. In such a situation, the mind can only cope with so much information at any one time. It is therefore forces to filter information and to allocate its priorities. The tendency is to focus on anything new or interesting and to allocate lower priority to routine.<sup>28</sup> This makes it possible by committing deception operations to draw the focus away from our real course of action. The German Ardennes offensive on 16 December 1944 is a good example of such self-deception.<sup>29</sup>

Deception is in many ways like tactics. When a victory is won we can not, according to Sun Tzu, "Repeat the tactics (and deception) but respond to circumstances in an infinite variety of ways."<sup>30</sup> This also applies to time since it is clear that the mind is susceptible to being deceived, but it is unlikely that we can deceive our victims for ever. All deception has a limited and relatively short span before it is exposed. The degree of sophistication required to make a ploy successful is directly related to the length of time over which it has to be sustained.<sup>31</sup>

#### Combat Motivation

A prudent man wields his power in modest measures. With brave men he finds that none is foremost or excels in all things.<sup>32</sup>

Anonymous, *Håvamål, The Sayings of the Vikings*

S. L. A. Marshal has in his famous book, *Men Against Fire*, described the modern battlefield. "The hardest thing about the (battle) field is that it is empty. No people stir about. There is little or no sign of action. Over all there is a great quiet which seems more ominous than the occasional tempest of fire. It is the emptiness which chills a man's blood and makes the apple harden in his throat. It is the emptiness which grips him as with paralysis."<sup>33</sup>

Danger and the unknown on the battlefield create a feeling of fear and stress that is often intense. When a soldier feels this intense fear and stress, the sympathetic nervous system mobilizes and directs the body's energy resources for action.<sup>34</sup> The "mid" brain (diencephalon) regulates the adrenal glands via the hypothalamus and the pituitary gland, which release the stress hormones adrenaline and noradrenaline and other adrenal hormones, in particular cortisol. This stimulates blood pressure and circulation and thereby the metabolic process, which improves in a dramatic way the individual's chances of survival. Suddenly, significant physical resources become available, which allow him to fight or flee, thus making survival possible.<sup>35</sup> This process may override the parasympathetic system that is responsible for the body's digestive and recuperative processes. When this happens, the process is so intense that soldiers very often suffer diarrhea, and it is not at all uncommon for them to urinate and defecate in their pants as the body literally "blows its ballast" in an attempt to provide all energy resources required to ensure its survival.<sup>36</sup> This shift in body functions in a fear and stressful environment is very psychologically straining and there is a powerful parasympathetic backlash once such a situation is overcome. The acceleration of the metabolic process leads to earlier than normal exhaustion. Drink, food, and sleep are required in proportionally larger amounts.<sup>37</sup> This creates a backlash that takes the form of an incredibly powerful weariness and sleepiness on the part of the soldier.<sup>38</sup>

History shows that this effect in stressful tactical situations can result in whole units become inactive. According to Ardant du Picq in his famous book, *Battle Studies*, this results in that, "He, general or mere captain, who employs every one in the storming of a position can be sure of seeing it retaken by an organized counterattack of four men and a corporal."<sup>39</sup> The human dimension demands that commanders must have an uncommitted flexibility or reserve within the organization in order to exploit opportunities. Since soldiers will only function for a limited period in a very stressful situation, measures must be taken to recuperate before new

commitments or reducing the stressful effects of the situation. If this is not done, the effects from repeated engagements will accumulate and eventually lead to a mental breakdown.<sup>40</sup>

Studies show that surprise is a major demoralizer.<sup>41</sup> We must thus try to surprise the enemy as much as possible to reduce his will to fight, while we at the same time try to minimize the effects of the enemy surprising us. Training and information seem to be the most important key to the reduction of surprise and of the concomitant potential for demoralization.<sup>42</sup> Training also forms unit cohesion that is essential to the effectiveness of all combat troops.

Motivation depends primarily on group cohesion.<sup>43</sup> Such cohesion or group bonds form fairly readily in many social situations, but they develop notably strongly in situations of danger, stress, and deprivation, particularly where military and social sanctions preclude escape from the threatening situation.<sup>44</sup> However, preparations for war are done in peacetime or in a non-threatening environment. Establishment of primary groups must then take into account human factors that facilitate unit cohesion. First, not all people are suited to become combat soldiers. In search of quality, character is more important than intelligence and skill. The armed forces are looking in particular for the supernormal, the mentally stable personality, who may be a little extroverted, and who looks for satisfaction in group activities.<sup>45</sup> Second, the primary group should not be too large. The ten soldiers of the section are if anything slightly too many. The ideal section has between three and five men.<sup>46</sup> Last, it has also been shown that the significance of long training is overestimated. It is not true that a national serviceman with eighteen months service is much inferior to a volunteer who leaves after three years.<sup>47</sup>

Training is an important aspect of the socialization process, but it is also crucial to the soldier's acquisition of reasonably accurate preconception of the feel, the form, and scope of battle. Training thus somewhat reduces the initial challenge to the soldier's combat motivation. Effective training also provides a soldier with a degree of self-confidence in his military skills and in his physical stamina that is valuable in combating fear.<sup>48</sup>

However, no amount of training will eliminate fear and stress on the battlefield. This is partly due to a good deal of fear in battle being irrational, and it may be aroused because a particular weapon is felt to be especially frightening although, rationally, it may not be recognized as being particularly dangerous.<sup>49</sup> Central to the question of fear of a weapon is the soldier's perception of his ability to do something about it.<sup>50</sup> The less tangible and reachable an enemy weapon is, the higher the threat is felt.

Air power, artillery and mortars delivering indirect fire that creates such an effect. However, historically, aerial, and artillery bombardments are psychologically effective, but only in the front lines when they are combined with the Wind of Hate as manifested in the threat of physical attack that usually follows such bombardments.<sup>51</sup> According to Dave Grossman, indirect fire must be combined with facing aggression and hatred of enemy ground forces.<sup>52</sup> This is due to soldiers resisting the powerful obligation and coercion to engage in aggressive and assertive actions on the battlefield, and dreading facing the irrational interpersonal aggression and hostility embodied in the enemy soldiers.<sup>53</sup> It is when faced by this feeling of or the reality of immediate danger, that soldiers exhibits a powerful tendency toward inaction and passivity, particularly when he goes to ground.<sup>54</sup>

This breaking of the will to fight rather than his ability to fight is the mental essence of applying maneuver warfare doctrine against enemy forces.<sup>55</sup> This is why putting friendly troop units in the enemy's rear is infinitely more important and effective than even the most comprehensive bombardment in his rear, or attrition along his front.<sup>56</sup>

John Keegan has in his excellent book, *The Face of Battle*, described the problems soldiers have concerning killing at close quarters.<sup>57</sup> This also applies to the individual, when he has to decide and execute a killing. According to S. L. A. Marshal most riflemen do not fire their own weapons for effect, they posture.<sup>58</sup> This should have consequences for organization of own units. The weapon systems should as far as possible be so designed that they are operated jointly

by at least two men, who preferably have visual contact or at least can communicate with each other.<sup>59</sup> In addition, men, particularly in dangerous and high-stress situations, desire leadership so that their immediate needs may be met and their anxieties allayed.<sup>60</sup> According to Stanley Milgram in his book, *Obedience to Authority*, this is due for the need for authority in order to legitimize an act (killing) that goes fundamentally against one's own conviction and nature.<sup>61</sup> In such a situation, the primary group also provides the necessary absolution for the individual to function after having done such an act.<sup>62</sup> Unit cohesion and the primary group thus both give the anonymity required to kill enemy soldiers and the support needed to function after having done such an act.

However, disintegration of group integrity and cohesion can be undermined by conditions of inactivity or stalemate wherein the unifying bond of immediate danger is reduced and the relevance of the military situation is questioned.<sup>63</sup> Efforts must thus be made to keep up reasonable activity and thus unit cohesion.

Such efforts must also be done when a member of the primary group has to be replaced for some reason or another. Based on historical experiences, the practice of introducing individual replacements into combat units just prior to, or during, battle without allowing them an opportunity to integrate themselves or to acquire social support, must be avoided since it has proved conducive to psychological breakdown.<sup>64</sup>

This brings forward the importance of regularly rotating troops out of combat. It is important for integrating individual and unit replacements and the prospect of rest and of an escape from stress provided the soldiers with a short-term personal goal against which he could plan his survival.<sup>65</sup> Without such a concept of rotating forces out of combat, we may end up in a similar situation as described by Swank and Marchand in their famous study from World War II. They determined that after sixty days of continuous combat, ninety-eight percent of all surviving soldiers will become psychiatric casualties of one kind or another.<sup>66</sup>

Action must be taken to prevent this from happening. The Israelis found that psychiatric casualties could be minimized by good unit moral, and specifically by good group cohesion, strong leadership, and the assurance that families were being well taken care of at home.<sup>67</sup>

### Conclusion

Trust is a prerequisite for command-by-influence to function properly. Such trust has a significant emotional side. It is thus important to note that emotional intelligence play a significant role in the execution of this method of command. EQ also play a very important role in decision making. This is especially the case for intuitive decision making that will be the predominant decision making method in a time-constrained environment. This type of decision making is based on heuristic thinking that due to simplification of the actual situation and making predictions based on earlier experiences, may lead to flawed decisions. It is in this context of vital importance to have a staff that can test the commander's intuitive vision and convey their results to him, even if they find it to be flawed. To support such testing of intuitive solutions, it is possible to employ fuzzy logic and nonlinear dynamic processes in future command and control systems. Such an approach can also be used to verify our perception of the enemy's course of action and thus reduce his ability of deception.

By employing deception, it is possible to reduce the enemy's combat power significantly. Such deception is based on the enemy making a different perception of what is happening than what is reality. Due to good intelligence resources, deception will, however, have a short duration. It will also be of vital importance to change deception approaches constantly in order for them to work.

The battlefield when facing the unknown is a very fear and stressful environment that drains soldier's physical and mental resources fast. Surprise and multiple engagements accumulate this effect. This effect must be used to reduce the enemy's combat power and own forces must be allowed to recuperate frequently in order to avoid this demoralizing effect.

Information, training, and unit cohesion will contribute to soldiers coping better with the fear and stress of the battlefield. However, fear is in many cases irrational and linked to the individual soldiers inability to counter weapons effects on the battlefield. Indirect fires have such an effect. Combined with ground maneuver and the feeling of being cut off, this can have a paralyzing effect of epidemic proportions.

Soldiers generally have a mental barrier that restricts them from killing at close quarters. Soldiers also avoid killing as individuals. Effective weapon systems should thus be crew served and have a figure of authority (leader) that allows for shearing the mental agony of killing. Once the killing is over it is of vital importance for the mental and moral balance of the individual that the unit cohesion allows for the individual's absolution. Unit cohesion thus becomes fundamental for keeping combat motivation.

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<sup>1</sup>Ardant du Picq, *Battle Studies*, 114.

<sup>2</sup>Sun Tzu, *The Art of War*, 66.

<sup>3</sup>J. D. Mayer and P. Salovey, *The Intelligence of Emotional Intelligence*, 433-442.

<sup>4</sup>Daniel Goleman, *Emotional Intelligence*, 289.

<sup>5</sup>*Ibid.*, xxi.

<sup>6</sup>Robert K. Cooper and Ayman Sawaf, *Executive EQ*, xi.

<sup>7</sup>Antonio R. Damasio, *Descartes' Error: Emotions Reason, and the Human Brain*.

<sup>8</sup>Cooper, xiii.

<sup>9</sup>Alvin and Heidi Toffler, *War and Anti-War*, 72.

<sup>10</sup>Anthony J. Sanford, *The Mind of Man*, 60.

<sup>11</sup>*Ibid.*, 61.

<sup>12</sup>*Ibid.*, 63.

<sup>13</sup>*Ibid.*

- <sup>14</sup>Ibid.
- <sup>15</sup>Ibid., 80.
- <sup>16</sup>Jennifer James, *Thinking in the Future Tense*, 40.
- <sup>17</sup>Ibid., 40.
- <sup>18</sup>Webster, *Webster's New Explorer Dictionary*, 258.
- <sup>19</sup>Microsoft, "Fuzzy Logic," *Encarta*.
- <sup>20</sup>Philips, *Fuzzy Logic Control and the XA: A Matter of Intuition*, 1.
- <sup>21</sup>Marco Iansiti, *Technology Integration*, 168.
- <sup>22</sup>Daniel Goleman, *Vital Lies, Simple Truths--The Psychology of Self-Deception*, 180.
- <sup>23</sup>Greg Casman, *What Causes War?* 112.
- <sup>24</sup>Sun Tzu, *The Art of War*, 102.
- <sup>25</sup>Robert L. Bateman III, *Digital War*, 39.
- <sup>26</sup>NATO. "NATO Glossary of Terms and Definitions--AAP-6 (V)."
- <sup>27</sup>Daniel Goleman, *Vital Lies, Simple Truths--The Psychology of Self-Deception*, 21.
- <sup>28</sup>Michael Dewar, *The Art of Deception in Warfare*, 10.
- <sup>29</sup>Mark Lloyd, *The Art of Military Deception*, 67.
- <sup>30</sup>Tzu, 100.
- <sup>31</sup>Dewar, 10.
- <sup>32</sup>Anon, *Håvamål--The Sayings of the Vikings*, 79.
- <sup>33</sup>S. L. A. Marshal, *Men Against Fire*, 44-45.
- <sup>34</sup>David A. Grossman, "Defeating the Enemy's Will: The Psychological Foundation of Maneuver Warfare," from *Maneuver Warfare: An Anthology*, edited by Richard D. Hooker, 147.
- <sup>35</sup>Elmar Dinter, *Hero or Coward*, 13.
- <sup>36</sup>Grossman, 148.
- <sup>37</sup>Dinter, 15.

<sup>38</sup>Grossman, 148.

<sup>39</sup>Ardant du Picq, *Battle Studies*, 167.

<sup>40</sup>Grossman, 162.

<sup>41</sup>Anthony Kellett, *Combat Motivation*, 329.

<sup>42</sup>*Ibid.*

<sup>43</sup>Dinter, 89.

<sup>44</sup>Anthony Kellett, *Combat Motivation*, 320.

<sup>45</sup>Dinter, 90.

<sup>46</sup>*Ibid.*, 92.

<sup>47</sup>*Ibid.*, 89.

<sup>48</sup>Kellett, 324.

<sup>49</sup>Richard Holmes, *Acts of War*, 210.

<sup>50</sup>*Ibid.*, 211.

<sup>51</sup>Grossman, 152.

<sup>52</sup>David Grossman, *On Killing*, 76.

<sup>53</sup>David A. Grossman, "Defeating the Enemy's Will: The Psychological Foundation of Maneuver Warfare," from *Maneuver Warfare: An Anthology*, edited by Richard D. Hooker, 151.

<sup>54</sup>Kellett, 326.

<sup>55</sup>David Grossman, *On Killing*, 80.

<sup>56</sup>David A. Grossman, "Defeating the Enemy's Will: The Psychological Foundation of Maneuver Warfare," from *Maneuver Warfare: An Anthology*, edited by Richard D. Hooker, 152.

<sup>57</sup>John Keegan, *The Face of Battle*, 264.

<sup>58</sup>S. L. A. Marshal, *Men Against Fire*, 50.

<sup>59</sup>Dinter, 95.

<sup>60</sup>Kellett, 326.

<sup>61</sup>Stanley Milgram, *Obedience to Authority*, 140.

<sup>62</sup>Grossman, 164.

<sup>63</sup>Kellett, 320.

<sup>64</sup>*Ibid.*, 323.

<sup>65</sup>*Ibid.*

<sup>66</sup>R. L. Swank and W. E. Merchand, *Combat Neuroses: Development of Combat Exhaustion*, *Archives of Neurology and Psychology*, vol. 55, 236-247.

<sup>67</sup>Kellett, *Combat Motivation*, 331.

## CHAPTER 6

### HISTORICAL DEVELOPMENTS

#### Introduction

Historical examples clarify everything and also provide the best kind of proof in the empirical sciences. This is particularly true of the art of war. Historical examples are, however, seldom used to such good effect. On the contrary, the use made of them by theorists normally not only leaves the reader dissatisfied but even irritates his intelligence. We therefor consider it important to focus attention on the proper and improper uses of examples.<sup>1</sup>

Carl von Clausewitz, *On War*

The intent of this chapter is to provide some historical trends within tactics and operations that will be relevant for future development of maneuver warfare doctrine. As Clausewitz has pointed out it is important to use historical examples correct. It is thus not the intent of this chapter to take out pieces of historical examples of lessons learned and use these in a different setting. It is historical trends and principles that may be applicable for future application that are of interest.

The Cold War with a cemented east-west confrontation between NATO and the Warsaw Pact became in many ways a stalemate that had a mental impact on development of tactical doctrine. Lessons learned concerning the use of mobile operations became overshadowed by a defensive approach. This is much the same that happened during the First World. After a short period of mobile operations in 1914, a defensive confrontation line between the warring parties crossed Western Europe and to a lesser degree Eastern Europe. This resulted in a huge stalemate that both parties tried to break in order to win the war. Germany and the Allies used different approaches in order to seek victory on the battlefield. The lessons learned through tactical, technological and operational innovation during the war also gave rise to numerous changes after the war and leading up to World War II. It is these trends during World War I and between the wars, that will be the focus of this chapter. The chapter will cover German innovation during

World War I and leading up to World War II. It will also cover Soviet innovation between the two world wars.

### German Change In Tactics During World War I

#### Introduction

World War I started with mobile operations that relatively soon came to a stalemate due to a combination of mobility, firepower and protection favoring the defense and not the offense. Only on the eastern front, where there was a far lesser ratio between forces and space was it possible to continue with mobile operations. The German practice of envelopment thus generally drew to a halt.<sup>2</sup>

It is from this period and onwards through World War II where T. N. Depuy in his excellent book, *A Genius for War--The German Army and General Staff, 1807-1945*, has made the historic observations showing that German Army forces generally had a twenty percent combat effectiveness superiority over the Western Allies, and also a three-to-two casualty-inflicting superiority.<sup>3</sup> Since the German Army did not have any materiel and technological superiority over the Allies, this must result in tactics and doctrine that are better suited for the nonlinear dynamics of war.

#### Elastic Defense-in-depth

The German Army changed tactical doctrine significantly on two occasions during World War I. The first change came during the winter of 1916-1917 with the adoption of a new defensive doctrine described as elastic defense-in-depth. This came as a response to the allied offensive tactics during 1916 and especially due to the British attack on the Somme. This attack started with a six-day preparation and an assault barrage of 1,628,000 artillery shells. The intent was to destroy all German resistance within artillery range. The British failed and a sufficient number of German defenders inflicted grievous casualties on the advancing British.<sup>4</sup> The

Germans called this style of warfighting the battle of materiel (die Materialschlacht). This was a war of attrition that the Germans did not have the supply of men and materiel to match.

Although the Somme battles continued until 19 November 1916, it became clear to the Germans by August 1916 that the battles at Somme, Verdun, and in the east could not be continued without a change in doctrine. Erich Ludendorff implemented the concept of elastic defense-in-depth. This was not a unique German concept, but a concept adapted from the French, who already in January 1915 had seen the need for dispersing their forces in depth.<sup>5</sup> However, French reluctance for losing additional ground and the Germans returning to a defensive posture led to the concept only being partly implemented.

The German doctrine of elastic defense-in-depth was officially adopted on 1 December 1916, when Ludendorff issued, *The Principles of Command in the Defensive Battle in Position Warfare*.<sup>6</sup> *The Principles of Command*, were accompanied by, *The Principles of Field Construction*, providing specific regulations for construction of positions.<sup>7</sup> Together these two regulations laid the foundation for the implementation of the elastic defense-in-depth doctrine. With this doctrine the Germans made the Allies concentrate their firepower on a forward part of the defensive system--the outpost zone. This zone was 500-1000 meters in depth with relative few German forces in strongpoint and in rearward slope positions. The mission of these forces was observation, reconnaissance, directing indirect fires and breaking up attacking formations. The following battle zone was usually at least 2000 meters in depth with numerous strongpoints. The third and last zone--the rearward zone was the zone with significant reserves out of range of the heavy allied firepower from where the counterattacks into the battle zone were launched.

Timothy Laupfer has described the effects of the elastic defense-in-depth concept in his study, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine During World War I*.

A fragmented, exhausted Allied attack force reaches the battle zone. They hope that their thorough artillery preparations have killed all the Germans, but they encounter several

German firing at them from shell holes and in the torn ground. Sudden fire from the German main line of resistance has slowed the Allies and their scheduled artillery barrage has crept forward without them, according to a timed sequence of fire they cannot modify. They feel helpless without artillery support. The Allies finally have taken the main line of resistance at great cost, but now they are in unfamiliar ground, under fire from concealed enemy machine gunners and riflemen. German artillery, which the Allied expected to destroy in the preparatory fires, now appears very active. The Germans concentrate their artillery fire behind the Allied advanced units, cutting them off from reinforcements and supplies. For the next few minutes, the Allies have a tenuous hold on a few acres of ground, but by advancing into the battle zone, the Allies are most vulnerable, and have exposed themselves to the counterattack, the soul of the German defense. The immediate counterattack, well coordinated with accurate artillery fire, destroys, captures, or ejects the Allied unit before it can consolidate its gains. The coherence of the German defense is restored.<sup>8</sup>

The allied reaction to this new defensive doctrine was to become more proficient in breaking into the battle zone. This made the German counterattacks more challenging and again brought out the offensive German spirit. Better allied cohesion in the battle zone also forced the Germans to delegate authority for committing the counterattacks to a very low level of command. Experience showed that counterattacks only were effective in a limited time-window before the allied forces were able to consolidate their gains. This created the foundation for a quick response.

The offensive training the Germans gained due to these coordinated and rapid combined arms counterattacks created one of the foundations for the use of the so-called *Hutier tactics* during the very successful spring offensive of 1918.<sup>9</sup>

#### Stormtroops

The other major foundation for this success was the use of *Slosstruppen*. The genesis of the *Slosstruppen* or stormtroops can officially be traced to 2 March 1915. The German General Staff then authorized VIII Corps to form a detachment for testing of experimental weapons and development of appropriate tactics that could break the deadlock on the Western Front.<sup>10</sup> After initial setbacks, Willy Ernest Rohr developed new tactics for breaking into enemy trench systems. He also reequipped the stormtroops and let the soldiers adapt uniform modifications and personal equipment to suite the new tactics.<sup>11</sup> The focus was on getting as much destructive power as

possible into the unit without reducing tempo of maneuver. New weapons used were, flame-throwers, trench mortars, large quantities of hand grenades, pistols with automatic fire capacity, new Sturmkanone, captured light machine guns and eventually machine pistols.

This new tactics was a concept of infiltration.<sup>12</sup> It proved to be a very successful tactics and stormtroop units were implemented into the military structure on 16 October 1916. By the end of the year, fourteen armies had such battalions and thirty divisions had established some sort of assault detachment.<sup>13</sup>

The stormtroop battalions of December 1916 usually were organized with one headquarters, two to four assault companies, one to two machinegun companies, one flame thrower platoon, one infantry gun (*Sturmkanone*) battery, and one mortar company, totaling up to 1,400 officers and men. Training was extremely hard with continued attacks on full-scale trenches using live ammunition. There was also extensive training on the conduct of operations beyond the trench lines. Maps on scale 1:5000 based on air reconnaissance was widely used and there was a focus on speed, with units training on marching sixty kilometers km per day with heavy ammunition loads. Ordinary infantry units were also retrained on infiltration tactics.

The new offensive doctrine was first used with huge success in large-scale attacks during von Hutier's attack on Riga in September 1917 and at Caporetto in October-November 1917. The experiences from these two campaigns were used to achieve an even better coordination between maneuver and fire support. On 1 January 1918 the General Staff issued the official doctrine, *The Attack in Position Warfare*.<sup>14</sup> The new doctrine was used on the attack against the British Fifth Army on 21 March 1918. The German forces here captured 140 square miles in twenty-four hours with a tenth of the casualties the British had used 140 days to take ninety-eight square miles of the same terrain during the battle of the Somme in 1916.<sup>15</sup> This was achieved with a five-hour intense and very precise artillery fire followed by the infantry attack. This was a very successful attack. However, lack of forces and logistics to follow up the initial success,

together with the allies' ability to shift huge reserves by rail and motor transport, prevented an exploitation of the breakthrough.

### Conclusions

The German concept of elastic defense in depth functioned very well by getting attacking infantry to break up and culminate inside the defensive zone and still enabling the Germans to use economy of force. The economy of force in the defensive effort also enabled a counterattack force that could defeat or destroy the attacking forces. However, such counterattacks would only be successful if they were executed swiftly allowing for utilizing windows of opportunity. This called for a decentralized command method and the use of combined arms forces on a low tactical level.

As the Allies started to use tanks in large concentrations and supporting tank attacks with air power, the Germans had to extend the defensive zone in order to be able to stop penetrations.<sup>16</sup>

The use of stormtroop tactics called for highly trained units with combined arms effects at squad and platoon levels. It also called for bypassing enemy strengths and utilizing weaknesses. This eventually morally weakened bypassed units and allowed for tactical victories. However, the lack of ability to support these victories due to lacking operational mobility eventually lead to loss of operational and strategic success.

### Evolution of German Mechanized Warfare

The Versailles terms had limited the German Army to 100,000 long service personnel.<sup>17</sup> In addition, the army was limited to 4,000 officers, and no tanks and air forces were allowed.<sup>18</sup>

Based on very limited resources and viewing potential threats from both the east and west, von Seecht focused on motorizing the army in order to create sufficient mobility to meet different threats quickly. Lack of aircraft, heavy artillery and tanks resulted in a focus on utilizing great mobility, better training, superior use of terrain and constant night operations as partial substitutes for modern weapons.<sup>19</sup>

Based on lessons learned with infiltration tactics from World War I, motorization was to solve the earlier lack of operational mobility. Operational mobility should now enable a complete penetration of the enemy and a subsequent envelopment.<sup>20</sup> However, motorization with primarily trucks did not give the desired protection and firepower. Only tanks could provide this. Cooperation with the Russians allowed for testing of such tanks inside the Soviet Union, and cars and trucks were used as dummy tanks to learn the concept of employing such capacities in Germany.

According to Len Deighton in his book, *Blitzkrieg*, it was Guderian who combined the concept of using mechanized forces to strike deep to hit the enemy's "brain," with infiltration tactics, and using military radio to control the operation.<sup>21</sup> The first came from reading J. F. C. Fuller's theories and the last from his own wartime experiences. A doctrine based on known tactics, command method and the application of new technologies was borne. The last ingredient, the uses of air power was to be tried out in the 1930s and tested in Spain and Poland before becoming of age.<sup>22</sup>

After the Poland campaign, the new German warfighting style became known as *Blitzkrieg*. The Blitzkrieg style of warfighting has been described as strategic, operational, and tactical concepts. Karl-Heinz Frieser has in his remarkable book, *Blitzkrieg-Legende*, summarized that it is basically tactics and can at best be applied also at the operational level of war. According to him, the German Blitzkrieg tactics is mobile warfare.<sup>23</sup> It is also mobile tactics that has its roots from World War I infiltration tactics, and as such, it focuses on avoiding strengths in order to keep a high tempo. This is supported by the use of a decentralized command method. Decisions are sought in the enemy's rear areas and the basic concept of defeating the enemy through encirclement was kept. However, such encirclements were in many cases during World War II difficult to finalize due to the major part of the army not being motorized and thus becoming too slow to prevent enemy forces from escaping.

### Soviet Deep Battle

Soviet military commanders developed a unique view of warfare based on the civil war experiences and the ill-fated Polish campaign in 1920. The civil war had been characterized by vast distances defended by relatively small numbers of troops forcing commanders to integrate all tactical operations into an overall campaign plan, aiming for objectives deep in the enemy's rear.<sup>24</sup> Concentration of superior forces to overwhelm the enemy at a particular point, and then rapid maneuvers such as flank movements, penetrations, and encirclements became the means of destroying thinly spread enemy forces.<sup>25</sup>

Combining these early Soviet experiences with technological developments, the military establishment in the Soviet Union started transcending from a concept of a broad front to pursuing a concept of deep battle in the 1920s. This resulted in their doctrine publication, *PU-29*, in 1929.<sup>26</sup> The intent was to transition from using cavalry and mechanized forces on a tactical level go deep enough to achieve operational objectives.

However, operations in 1929 by the Trans-Baikal Group against the Manchurian Army using the doctrine of *PU-29* failed. The T18 tanks supported by aircraft outran the artillery and the infantry. The infantry was also pinned down by machine gun fire. The Soviets thus experienced a situation very similar to the British lessons learned at the Battle of Cambrai in 1916.<sup>27</sup>

Based on theoretical works by V. K. Triandafillov, Tukhachevsky, A. I. Egorov and others an operational concept for deep battle was established.<sup>28</sup> This resulted in changes in force structure and tactics. According to Triandafillov, the best way of achieving operational deep battle objectives was to increase the mobility of modern armies by improving the technology of transportation assets.<sup>29</sup> By achieving this, it was possible to change the nature of both the fixing force and the breakthrough force.

In 1936 with PU-36, the concept was on a mobile holding force that was able to hold an enemy on a broad front. A second mobile force--the breakthrough force, would as its name indicate, conduct the penetration and the tactical deep operation. A third force consisting of cavalry and mechanized units with operational mobility would use the tactical breakthrough and pursuit operational deep objectives.<sup>30</sup> According to theory, such objectives could be at 200 kilometers depth. Airborne forces should support this effort in order to achieve greater operational tempo.

The concept required two types of mobile forces with different tempo and mobility. According to Simpkin, the holding force should be able to operate at *twice* the tempo of the opposition and the mobile forces conduction deep operations should work at a tempo between two and three times that of the holding force.<sup>31</sup> The conduct of deep operations thus requires a force structure with a force dichotomy.

### Conclusions

The intent of this chapter has been to find certain tactical principles and trends based on historical experiences that can be used in modern maneuver warfare based tactics.

The principles of World War I concept of elastic defense in depth can be used to fix enemy forward forces in depth and at the same time allowing for own economy of force. Such economy of force will allow for own concentrating of forces for conducting counterattacks or maneuvers into the enemy's rear areas. A modern version of the elastic defense will, however, need a far greater depth and also require the use of own mobile forces in order to generate a sufficient high tempo of operations.

Own mobile forces should apply the stormtroop approach of bypassing strengths (surfaces) and seek out weaknesses (gaps). As during World War I, this will ensure a high tempo of operations. This does, however, call for using the force mounted on vehicles with protection

and firepower, instead of on foot, to avoid the German First World War results and instead benefit from the best of the Blitzkrieg experiences.

Both the Blitzkrieg concept and the Soviet deep battle concept show that decisions are best achieved by employing forces deep against the enemy's brain, support and lines of communications. This does, however, call for a force dichotomy, where one part of the force is best suited for the conduct of engaging the enemy forward forces and the other part the enemy's rear areas. These forces should differ in tempo and operational mobility. The difference should, however, not be as significant as for the German foot infantry and the armored forces. If this is the case there will be a significant reduction in the overall force efficiency, since one part of the force will have problems with supporting the other without an overall reduction of operational tempo.

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<sup>1</sup>Carl von Clausewitz, *On War*, 199.

<sup>2</sup>U.S. Army General Staff, Tactical Study No 1, "A Survey of German Tactics," 1.

<sup>3</sup>T. N. Depuy, *A Genius for War--The German Army and General Staff, 1807-1945*, 4.

<sup>4</sup>Timothy T. Lupfer, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine During World War I*, 6.

<sup>5</sup>*Ibid.*, 3.

<sup>6</sup>*Ibid.*, 12.

<sup>7</sup>*Ibid.*, 13.

<sup>8</sup>*Ibid.*, 16.

<sup>9</sup>Dennis J. Vetock, *Lessons Learned--A History of U.S. Army Lesson Learning*, 1988, 44.

<sup>10</sup>Ian Drury, *German Stormtrooper; 1914-1918*, 5.

<sup>11</sup>*Ibid.*, 6.

<sup>12</sup>The Infantry Journal 1939, "Infantry in Battle--Second Edition," 308.

<sup>13</sup>Drury, 6-7.

<sup>14</sup>Timothy T. Lupfer, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine During World War I*, 41.

<sup>15</sup>*Ibid.*, 50.

<sup>16</sup>Len Deighton, *Blitzkrieg*, 109.

<sup>17</sup>Charles Messenger, *The Art of Blitzkrieg*, 57.

<sup>18</sup>James S. Corum, *The Roots of Blitzkrieg*, 34.

<sup>19</sup>*Ibid.*, 40.

<sup>20</sup>Barry R. Posen, *The Sources of Military Doctrine*, 190-191.

<sup>21</sup>Deighton, 119.

<sup>22</sup>F. O. Miksche, *Attack*, 98.

<sup>23</sup>Karl-Heinz Frieser, *Blitzkrieg-Legende*, 8-9.

<sup>24</sup>David M. Glantz and Jonathan House, *When Titans Clashed*, 6.

<sup>25</sup>*Ibid.*.

<sup>26</sup>Richard E. Simpkin, *Deep Battle*, 38.

<sup>27</sup>Charles Messenger, *The Art of Blitzkrieg*, 63.

<sup>28</sup>David M. Glantz, *Soviet Military Operational Art--In Pursuit of Deep Battle*, 78.

<sup>29</sup>V. K. Triandafilov, *The Nature of the Operations of Modern Armies*, xxxv.

<sup>30</sup>Richard E. Simpkin, *Race to the Swift*, 38.

<sup>31</sup>*Ibid.*, 149-150.

## CHAPTER 7

### ENVIRONMENT AND FORCES

#### Introduction

This chapter will give environmental background and a description of Russian doctrine for the final analysis of the thesis. It will also give a status of current Norwegian Army doctrine and forces in order to provide a basis for recommendations for future changes in tactics and organization of the Norwegian Infantry.

#### Geography, Climate, Demography, Infrastructure, And Economy

The Kingdom of Norway consists of the mainland, the archipelago of Svalbard and the island Jan-Mayen. Svalbard including Bear Island, covers all islands situated between ten degrees and thirty-five degrees east longitude and between seventy-four degrees and eighty-one degrees north. latitude. The Svalbard Treaty, of 9 February 1920 declares Svalbard demilitarized area. Jan-Mayen is an island situated in the northern Atlantic between Island and Greenland. Mainland Norway, Svalbard and Jan-Mayen have a 200 nautical mile economic zone totaling of two million square kilometers.

The Antarctic territories of Bouvet Island, Peter I's Island, and Queen Maud's Land (twenty degrees west and forty-five degrees east) are dependencies under Norwegian sovereignty.<sup>1</sup> This thesis will focus on the mainland of Norway including islands along the mainland coast.

Mainland Norway has a land area of 323,878 square kilometers and occupies the western part of the Scandinavian Peninsula. It shares a border with Sweden, Finland, and Russia. The country is long and narrow, with a coastline deeply cut by deep fjords. The coastline extends about 2,740 kilometers--including all the fjords and offshore islands, the coastline totals about 21,930 kilometers. Mountain ranges, some capped with Europe's largest glaciers, cover more than half of the land mass. Only three percent of the country is arable. Forests cover twelve

million hectares, or thirty-seven percent of the land area.<sup>2</sup> This is for the most part cultivated forest accessible for forestry. In the southern part of the country, the tree line is generally above 1,000 meters. The area above the tree line is without large vegetation and consists of moors, mountains or high mountain plateaus. The tree line declines towards the northern part of the country and reaches sea level at the border between the two northernmost counties--Troms and Finnmark.

Norway is known as the "Land of the Midnight Sun." This is more than a promotional slogan since nearly a third of Norway lies north of the Arctic Circle. North of this latitude there is at least one day when the sun never sets during summer and one day where it never rises during winter.

The typically rainy climate of mainland Norway is mild for its latitude, and thanks to the Gulf Stream, all its coastal ports remain ice-free throughout the year. The coastal mountain ranges block the moisture-laden prevailing southwesterly winds, and precipitation can reach 5,000 milimeters annually. The continental climatic influence and the corresponding high pressure zones are most prevailing in the southeast, in central Norway and in the far north. These areas usually have less than 1,000 milimeters of precipitation annually.<sup>3</sup>

In summer, the average maximum temperatures for July are sixteen degrees centigrade in the south and around eleven degrees centigrade in the north. However, summer temperature extremes are also possible even in the Arctic region with over thirty degrees centigrade. In winter, heavy snowfalls are common, and snow can accumulate up to ten meters in the mountains. However, accumulation of two to three meters is more usual in the lower areas. In January the average maximum temperature in the south is one degree centigrade and in the north, minus three degrees centigrade. It can get much colder, however; in January 1999, the temperature in the central parts of Finnmark dropped to the very chilly minus fifty-six degrees centigrade.<sup>4</sup>

Norway's population of 4,438 million (July 1999)<sup>5</sup> represents among the lowest population densities in Europe, at thirteen people per square kilometer. The majority of the population lives in towns and cities in the southern part of Norway. The northern part of mainland Norway, North Norway, has about eleven percent of Norway's population. Because of this very low population density, the infrastructure in the north is limited. As such, there is only one main road axis from South Norway, the E-6, going through all of North Norway ending at Kirkenes on the Russian border. The rail network in North Norway is very limited. One single track from South Norway ends midway in North Norway at the town of Bodø. The lack a heavy road and rail infrastructure in North Norway is compensated by a highly developed air transport system with numerous air ports and air fields, and an excellent sea transport system with good port facilities. Close to all transportation of goods to and from Norway go by ship. This is also the case for over ninety percent of all goods transportation between South and North Norway. These transport requirements support a one of the world's largest merchant marines with over 2,300 vessels above 1,000 gross tons.<sup>6</sup>

Norway has a good economy with one of the highest standards of living in the world-- gross domestic product (GDP) per capita in 1997 was \$34,820. The country is debt free and has an annual budget surplus of about ten percent of the total federal budget. The total employed labor force is 2.3 to 2.4 million, with unemployment under three percent.

Norway is the world's second largest exporter of oil and natural gas. Oil and gas related activity covers about fifteen percent of the GDP. Other major economic areas are fisheries, shipping, electrochemical and electrometallurgical industries, forestry, electrical energy, telecommunications and information technology.

#### Norwegian Security Policy

The White Paper No. 22 (1997-1998), to the Norwegian Parliament; *Principal Guidelines for the Development and Activities of the Armed Forces for the period 1999-2002*, covers the

current four-year planning period and the vision for the development of the armed forces until 2018.<sup>7</sup> In this White Paper, the Government states that Norway currently has no direct threats to her sovereignty. However, Norway can not overlook the long-term uncertainty that surrounds future security developments. This uncertainty contains within it the risk that armed conflicts in other regions could spread to areas that are closer to home. Hence the Government takes the view that Norway must still maintain a sound and credible defense organization in order to ensure that she has the capability, should it become necessary, to defend her freedom and interests. Such an effective and credible defense capability is not something that can be built up overnight. The way Norway's armed forces develop in the future must leave no doubt about her capacity to safeguard her security.

The Armed Forces constitute the main pillar in the Government's security policy, and seek to defend the entire country against military attack and contribute to managing crises of different types and magnitude. These challenges embrace everything from the infringement of Norwegian sovereignty to crises and even military attacks on Norwegian territory. Challenges against Norwegian security may also include other types of dangers such as proliferation of nuclear, biological, and chemical weapons, terrorist attacks, environmental destruction, and international military crises and wars.

Norway is a participant in both European, transatlantic and global security organizations. Amongst these, NATO has a special place. Norway will continue to be dependent on political and military cooperation within NATO. Because of the changed international situation, the Northern Region is not the focus of allied attention to the extent that it was during the Cold War. At the same time, it is expected that Norway will take her share of the common burden through its contributions to mutual defense and international peace operations. As such, the national defense planning will continue to be based on allied military reinforcement in the event of crisis or war.

At present, there is no military threat to Norway. Norway's relations with Russia now offer great potential for future cooperation both bilaterally and within multilateral frameworks. The considerable conventional and nuclear capability deployed in North-West Russia will, however, remain a factor significantly affecting Norwegian security and defense policy. The uncertain political outlook in Russia and the possibility of the spread of armed conflicts from other regions to nearby areas means that these capabilities could imply a risk to Norway's security.

These future challenges have resulted in a Norwegian defense policy is based on four main cornerstones:

1. A balanced national defense capable of bearing the brunt of the defensive operations needed in the initial stages of a war and to give credibility to her ability to cooperate with, and provide a command structure for, allied reinforcements on Norwegian territory. The aim is still to maintain our capacity to defend one region of the country at a time against invasion for a limited period.

2. Allied military assistance and international cooperation. The political and military support of our allies is of critical importance to our security and her defense.

3. Total Defense, which means that the Armed Forces can draw upon all the functions and resources of society in time of crisis or war.

4. Compulsory military service. The principle of compulsory military service remains unchanged.<sup>8</sup>

#### Armed Forces

The current security situation allows freedom of action for the Government to implement the necessary changes of the Norwegian Armed Forces. The principal guidelines for the development of the force structure are:

1. A unified defense in which the different facets of defense activities and the associated force structures are carefully balanced and matched to the tasks of the Armed Forces in peace, crisis or war.

2. Freedom of action to make it possible to respond to the requirements of changing conditions.

3. Sensible standards of quality and force strength.<sup>9</sup>

The capability of repelling an attempted invasion in one part of the country while defending the whole of the country against more limited aggression is the dominant factor affecting the structuring of the Army. The Army's main contribution to anti-invasion defense is 6th Division with three divisional brigades, two infantry, and one armor. In addition, the Army has three independent brigades and twenty independent infantry battalions for reinforcing the anti-invasion defenses, and to contribute to territorial defense, crisis management and the safeguarding of Norwegian sovereignty. The division and one independent brigade will be given priority with regard to the procurement and allocation of materiel and equipment. By about 2006 the quality of the lowest priority army units will be marginal and there will be a requirement to reduce the number of brigades and the restructuring of parts of the territorial forces. It is assessed that the land component of the Home Guard will remain unchanged and that the number of low priority infantry battalions and companies will be reduced.

Norway's international military involvement will continue to represent a prominent and integral part of the overall activities and structure of the Armed Forces. Increased priority will be given to the establishment of an integrated system embracing all Norwegian participation in international peace operations irrespective of the nature of the participation and the organizational framework of the operation itself. Forces kept in readiness for future international operations are to be organized as either reaction forces, reinforcement forces or follow-up forces. The Army's contribution in this respect will be organized within a brigade framework. These forces will be

organized along the same principles as the majority of the army; for the defense of mainland Norway. However, different missions, special environmental and force protection measures will result in some differences in equipment and training. Infantry units earmarked for international operations will therefore have equipment like armored personnel carriers (APC) and infantry fighting vehicles (IFV). The remaining part of the Army's infantry battalions will not have such equipment since all armored and mechanized forces are part of the Cavalry and due to the CFE Treaty limitations not allowing for such equipment.

The territorial forces consist of the Home Guard, two fortress battalions and infantry companies. Mobile maneuver forces consist of eight cavalry battalions and thirty-two infantry battalions. These infantry battalions are organized as twelve motorized battalions with all-terrain and over-snow vehicles (BV 206 and BV 202), one motorized guards battalion (HMK's Guards), one motorized immediate reaction force (IRF) battalion, four Jeger battalions, and fourteen field battalions. The IRF and motorized battalions are equipped to operate in a main battle zone. The HMK's Guards battalion and the field battalion are equipped to secure decisive points in the rear areas, flanks and defeat raiding forces. The Jeger battalions are organized and equipped to attack deep high payoff targets.

With the exemption of the Jeger battalions, all battalions are organized with three rifle companies, one combat support and one headquarters and combat service support company. The Jeger battalions have four companies. For the Jeger battalion in 6th Division these are four identical Jeger companies. For the three battalions in Finnmark, there are three Jeger companies and one combat service support company.

The 6th Division has six motorized infantry battalions organized into two brigades, and one independent Jeger battalion. The 12th and 15th Independent Armor Reinforced Infantry Brigades each have two motorized battalions and one armored battalion. Towards the Norwegian--Russian border, Finnmark Regiment has three Jeger and one motorized battalion.

Section 109 of the Norwegian Constitution states that, “As a general rule every subject of the State is equally bound to serve in the defense of his country for a specific period of time, irrespective of birth or fortune. The application of this principle and the restrictions to which it shall be subject shall be determined by law.” Consequently, all fit males finish a six or twelve months basic military training at the age of nineteen to twenty. The six months training is for the Home Guard and fully focuses on their mission. The Home Guard has one-week refresher training on each unit’s mission every year. For the Army, the twelve months training focuses on building individual skills and cohesive units. Once the units have reached their training objectives and the national service is finished soldiers, noncommissioned officers and officers are transferred into mobilization formations as whole units in order to secure unit cohesion and highest possible combat power. These formations generally have a peacetime cadre that conducts command post and computer based exercises annually or biannually. Large-scale mobilization and field training exercises are generally conducted every four years. As soldiers grow older, they are transferred to lower priority units or the Home Guard in order for the prioritized mobile units to have as high a combat power as possible. For soldiers, all peacetime international service, like NATO operations in Kosovo, is voluntary. In crisis and war the Government will deploy mobilized forces outside of Norway as deemed necessary.

The Norwegian Total Defense Concept means that all sectors of civilian society are under obligation to render assistance to the defense of Norway by law. This requires peacetime preparations and close cooperation between civilian and military authorities within the Total Defense Concept. As such, a number of tasks, which in other countries are the responsibility of the armed forces, are in Norway handled by civilian institutions. This applies especially to logistics support, transportation, infrastructure, construction engineering and communications.

### Risks

Never walk away from home ahead of your axe and sword. You can't feel a battle in your bones or foresee a fight.<sup>10</sup>

Anonymous, *Håvamål--The Sayings of the Vikings*

It is a major objective of Norwegian foreign policy to have a good relationship with all neighboring countries and solve problems through dialogs. However, Norway's geo-strategic position and Russia's situation still calls for Norway to view Russia as the country's only potential major security risk.

Norway appreciates that the international situation has changed significantly after the dissolution of the Warsaw Pact, the demise of the Soviet Union, and the Russian retreat from Central Europe. As such, the immediate threat from the east is gone. Nevertheless, Norway as a close neighbor has to live with a few remaining realities. First of all, whatever direction the political process may take, Russia will remain an important military power in Europe for all future. Second, it is a fact that Russia is a country short on democratic traditions and with huge economic and ethnic problems, and whose future is very hard to predict. Third, it is a fact that the Northern region of Russia, and in particular the Kola base complex will remain strategically vital to Russia for all foreseeable future. Finally it is a military fact that while Russian troops and equipment has been withdrawn elsewhere, this has lead to more modern military equipment being transferred to the Leningrad Military District. Norway does by no means perceived this as an immediate threat to North Norway, but it is nevertheless a useful reminder that Russia is a military power with strategic interests, and will remain so. A continued strong military presence in North Norway, combined with strong ties to NATO, will therefore remain the cornerstones of Norway's defense in the north.

A number of different scenarios would trigger a crisis involving Norway and Russia. Due to existing disagreements over the economic zone, one future possibility could be a local

conflict of interest over for instance oil or fishery resources. Other possible scenarios could occur as a result of crisis or conflicts in other regions that may trigger a Russian need to secure their strategic retaliation capacity on Kola and as such involve Norwegian territory.

In theory and after an initial crisis, two different levels of military conflict involving North Norway could be possible. One is a reinforced attack on North Norway to obtain control of Norwegian territory and the surrounding sea and air space. Such a possible operation would obviously have to be part of a future large-scale strategic offensive. The other conflict option would be a much more limited, but at the same time more likely, operation towards Finnmark. Rather than being part of a strategic offensive, such an operation could be motivated by an overall defensive strategy from the Russian side. The objective could be to prevent a potential threat against vital nuclear assets and installations in the Kola region. Such a limited option would not require a large build-up of forces, and may take place with less warning time. Even within the limitations of the CFE treaty Russia possesses the force level required, inside the Leningrad Military District, to execute a limited operation if she so desires. For a limited attack, it is assessed that it is currently possible to mobilize and train sufficient forces over a couple of months. For a large-scale invasion in one strategic direction, it is assessed that this will take eighteen to twenty-four months.<sup>11</sup> Warning time for such an operation will, however, be less since it always takes time to identify and accept the opposer's intent, and then act to counter it.

#### Potential Combat Zone

Should a crisis develop that requires a buildup of military capacity in North Norway, it will be of vital importance to secure a basis for the reception and sustainment of Norwegian and allied forces. Based on availability of infrastructure, lines of communication and geographic realities, such a basis for operations is found in the northern part of the county of Nordland and the southern part of the county of Troms. This area is the gateway to the most populated area in North Norway and an important concentration of infrastructure like port facilities, airfields, and

stores of military and civilian supplies. In this area, all road axes leading from Russian territory through Finnmark and Finland terminate, and here are the likely capability-driven limits on strategic-level airmobile and amphibious operations towards North Norway. This area is also ideally suited for channelizing an enemy, allowing for numerous blocking positions along the fjords and in the deep valleys, while simultaneously attacking against his flanks and rear. This is the same type of concept that was adopted by the Germans when they had to withdraw from the Northern Flank in 1944.

The terrain in Finnmark is much more open than in Troms, and does not permit a decisive battle with the force level Norway can employ in a conflict. The ambition in Finnmark is therefore initially to deter war through the establishment of a defense strong enough to constitute a threshold against a limited attack. Due to the proximity to major Russian airbases, own use of land forces in eastern Finnmark will be the specially equipped and trained Jeger battalions. Should deterrence fail, operations in Finnmark will be aimed at delaying enemy advance, keeping an updated intelligence picture and to inflict as heavy losses as possible, particularly against high payoff targets.

#### Effects of Cold Weather on Operations

The physical extremes of cold conditions with snow and ice, slush, mud, and the extremes of weather all restrict the mobility of a military force. In conditions of extremely low temperature or where significant layers of snow are present, combined arms operating conditions will have to change to reflect these circumstances. In these situations, the infantry, with their inherent mobility, will be at a premium, together with engineers whose ability to enhance mobility and counter mobility will also be a much valued asset.<sup>12</sup>

Where the sea is free of ice, the relative mobility of ships compared to that of land forces operating over difficult country can be used to advantage. Thus naval forces can provide fire support to supplement that provided by ground and air elements, and troops can be put ashore in

areas which may be difficult to reach overland. For such amphibious operations it becomes vital to keep soldiers and equipment dry in order to keep the units functional.

The very remoteness of the potential combat zone, when combined with the problems of ground mobility, give air support great significance. However, limitations arising from the climate and the terrain may restrict the use of aircraft. A major problem is the limited availability of airfields and the difficulty of maintaining suitable runways for high performance aircraft and helicopters.

Limited visibility and icing will often pose operational limitations. Fog is most frequent in coastal areas, and if aircraft can take off and land, sorties against inland targets are often possible. However, the weather can change rapidly and due emphasis should be given to forecasts before aircraft are committed, particularly if diversion airfields are not readily available.

Cold, snow, wet conditions, darkness, and wind have a psychological impact on personnel and increase the difficulty of operating effectively. The history of warfare in cold weather conditions has illustrated frequently that the weather generally causes far more casualties than any enemy forces.

Fear of the snow, the cold and exposure can have a stronger effect on the untrained and the inexperienced than fear of the enemy's weapons. A soldier who is 'winter scared' becomes withdrawn, apathetic and indifferent. The common symptoms are that he often stands still, feels cold and reacts slowly or not at all, when spoken to. He lacks the ability and will to take care of himself. Other results of this 'cold weather phobia' are an unwillingness to obey orders, avoiding duties to be able to remain in the sleeping bag or in the tent, leaving his post in order to warm himself and becoming irrational in his behavior. This phobia can be overcome, but only with careful and progressive training in cold weather conditions. Soldiers have to learn the drills and procedures that aid survival and take a positive attitude to overcoming the worst effects of these conditions.<sup>13</sup>

### Russian Doctrine

Russia has reorganized her Army into Permanent Ready Forces, Mobile Forces and Strategic Reserves.<sup>14</sup> The Kola area has Permanent Ready Forces and any operations against Norwegian territory is assessed to be executed by a combination for Mobile and Permanent Ready Forces. Due to the proximity to own base of operation on Kola, any land offensive will be a joint operation with maritime forces and air supporting a land offensive. This will be an offensive based on the principles of nonlinear warfare. For such an operation, Russian forces close to the base of operation must be expected to have a favorable air and maritime situation.

The forces stationed in the Kola area are specially equipped for operations in this environment. Significant features are the use of MT-LB in the maneuver battalions, tracked logistics trains and increased engineer capacities. The reorganization of forces to corps with brigades will continue in order to give a higher degree of flexibility. Both the Army and Navy have significant Special Forces capacities and the Navy has one Marine Infantry Brigade on Kola.

Development in Russian doctrine calls for a maneuver approach to combat.<sup>15</sup> It builds on Armored Warfare Doctrine and Nonlinear Warfare Doctrine. These have many similarities with doctrine based on maneuver warfare theory. However, there is among others a significantly different approach to command and control.

Fires are the decisive element in battle and the senior commander will closely coordinate the actions of his subordinates to exploit the results of such fires. This will include the concentration of missile, artillery and aviation fires. The commander will direct maneuver and fires to ensure the unity of their actions in terms of time and place to ensure the advancement of his aim. However, the handling of tactical formations and units will be left to their commanders. Moreover, the development of fast moving and changing situations will, thanks to time constraints, be entrusted to the initiative of the latter guided by their understanding of the senior commander's intent and area or axis of main effort. Tactical groupings, which can act

independently, will be created, to ensure that they can meet the challenge, without having to wait for reinforcement from above.

The commander will indicate clearly the axis, or the area of main effort. The main effort will normally be directed towards the destruction of the enemy's main grouping, which is the cornerstone of his fighting power at each level. This direction will almost always be his means of controlling and waging long-range battle.

Getting within the enemy's decision making cycle is critical to success. This is particularly important in the conduct of long-range combat, where minutes can be decisive. As a general principle, Russian doctrine says that the winner in the battle for time will be the victor in the physical and electronic conflict. Enemy reactions will become increasingly belated and therefore ineffectual.

Success will only be achieved by taking the battle to the enemy, especially into his depth wherein lie his key command and control assets and weapons systems. Passivity and any attempt to spread scarce resources more or less evenly over an increasingly large battle area will result in defeat. Upon identifying the enemy's center of gravity, he will attack it as aggressively as possible. In doing so, risks must be taken, and he believes that the best way to minimize risk is to seize the initiative and impose its will upon the enemy, forcing him into a reactive posture.

The destruction of key enemy groupings will normally be the aim at the tactical and operational levels. However, this will not be approached in an attritional style of warfighting. Instead he will seek to exploit enemy weakness and through tactical and operational maneuver. Attacks will be aimed at the enemy's command and control system, his logistics and to split the enemy's groupings into non-cohesive elements that can be destroyed in detail.

Reserves will be employed when the enemy reaches his culminating point in order to break him. When reserves are committed, new ones must be created. A significant element of the reserve will have to be airmobile.

Commanders will execute command from the front especially at the tactical level in order to have a feel for the battle. This secures personal observation of the key sector and enables the commander to make the correct decision and, moreover, do so in good time. Commanders at all levels will seek to avoid stereotype actions that can be predicted by the enemy. Such actions are not only likely to fail, resulting in lost time, but also result in unjustified and possibly unacceptable losses.

### Norwegian Doctrine

Based on the geography of North Norway and limited infrastructure, all military operations during the Cold War were planned and executed based on a joint and combined concept. As such, Norwegian doctrine has traditionally been joint. A joint combined operational headquarters at Reitan outside Bodø have exercised command and control over all forces operating in North Norway since it was established in 1971. This operational concept was up until the end of the Cold War a relatively static defensive concept. There was, however, within this concept flexibility that allowed for mobile operations and offensive with land forces on battalion and brigade level.

This changed in the early 1990s as the result of downsizing of the army and the establishment of a mobile division, the 6th Division. While maneuver companies and battalions earlier had been the main maneuver units, now divisional brigades became the tactical maneuver formations within the division. The divisional brigades became pure maneuver units. The combat support and combat service support from the original combined arms brigades were moved to divisional level. The brigades were kept light in order to gain tempo and be able to accomplish relatively deep operations. Support was pushed forward from division and directly to maneuver battalions. By doing this, motorized infantry brigades could attack swiftly across fifty kilometers of rough country without any road axis. The objectives for these attacks were use the

canalizing terrain and to split or cut of enemy formations thus creating conditions for defeating or destroying the enemy piecemeal.

The Norwegian Army doctrine calls for a generic three phased approach. The first phase is controlling and shaping the enemy into favorable geography, and reducing his overall combat power and cohesion by using economy of force in depth. The second phase has the intent of defeating the enemy by maneuvering own forces into positions where it is possible to destroy him piecemeal. If the enemy does not give up his intent, the third phase will be to destroy remaining enemy forces.<sup>16</sup>

These phases overlap at land command or corps, divisional and independent brigade level. However, at the tactical (divisional) brigade level they can be viewed as a rhythm in operations and each phase can be viewed as an independent tactical brigade operations within the division's concept of operations.

Both the land command and corps and divisional-level have means for the conduct of deep operations. At land command level deep operations may go beyond 300 km, while it at divisional level may go to 200 kilometers. Of infantry units, the land command has three jeger battalions and specialized Home Guard units for deep operations. The division has one jeger battalion. Rear area operations and flank security are at the land command level conducted by territorial regiments with a mix of Home Guard battalions and Army field battalions. The field battalions move as critical vulnerabilities in the flank and rear area change. For the division and independent brigades these duties are conducted by territorial forces that are OPCON from the territorial regiment to the division and brigade.

Dedicated fortress battalions are used under OPCON of division of independent brigades to fix enemy advance in order to allow for armor and motorized infantry to maneuver during the maneuver and destruction phases.

Both land command and division can conduct amphibious or sea-borne operations. Such operations are integrated into the overall joint operations concept. The same is the case for heliborne operations. One transport helicopter battalion is usually used for such operations and for logistics and evacuations purposes. Maritime means are also extensively used for these purposes.

On the military strategic and operational levels, the army formations are moved as deemed necessary. This is done by using a combination of military and civilian resources under the Total Defense Concept. In March 1999 during exercise, Strong Resolve 1999, the 6th Division was moved using this concept from Troms to Trøndelag a distance of 1,000 kilometers, by using land, air and sea transport. One independent brigade was moved overland from the Oslo area to Trøndelag a distance of 600 kilometers over land.

This supports the concept of concentrating most of the Norwegian Army in one operational direction once allied forces have arrived in Norway and can secure reception and staging areas.

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<sup>1</sup>Norwegian bureau of Statistics, *The Statistical Yearbook of Norway--1999*.

<sup>2</sup>Deanna Swaney, "Norway," *Lonely Planet*, 28.

<sup>3</sup>*Ibid.*, 23.

<sup>4</sup>*Ibid.*

<sup>5</sup>CIA, *Facts Book 1999*.

<sup>6</sup>Microsoft Encarta; <http://encarta.msn.com>.

<sup>7</sup>The Norwegian Ministry of Defense, The White Paper No. 22 (1997-98), *Principal Guidelines for the Development and Activities of the Armed Forces for the period 1999-2002*.

<sup>8</sup>*Ibid.*, Chapter 6.

<sup>9</sup>*Ibid.*

<sup>10</sup>Anon, *Håvalmål--The Sayings of the Vikings*, 53.

<sup>11</sup>The Norwegian Atlantic Committee, *Nordic Security and the Military Balance 1999-2000*, 5.

<sup>12</sup>UK Army, "The Army Field Manual," Vol 4--Part 4--Cold Weather Operations," 4-36.

<sup>13</sup>*Ibid.*, 1-5.

<sup>14</sup>Nils M. Rekkedal, "Russian development of modern Army Forces. Use of Non-linear Warfare theory as part of the Russian Army Reform. Development from 1970 to today," *Temahefte 14/97*. Norwegian Defense Intelligence Staff, 1997, 16.

<sup>15</sup>UK Army, "The Army Field Manual--Vol 2--Generic Enemy (Mobile Forces)-- Part 1--Operational Art & Tactical Doctrine," I-22.

<sup>16</sup>Hæren, "Taktisk doktrine for Hæren--Hefte 4," 6.

## CHAPTER 8

### TECHNOLOGY AND ORGANIZATION

#### Introduction

Soviet military writers have identified three scientific-technical revolutions, two of which are historical and one of which is occurring now. These revolutions occur not as the result of a single new weapon or technology, but when groups of technologies emerge that together transform the nature of warfare. Such revolutions took place in the 1920s and 1930s when the internal combustion engine, mobile radios, and military aviation combined to increase both the speed with which armies could advance and the depth to which they could penetrate. Another revolution took place in the 1950s, when ballistic missiles and nuclear weapons made it possible to bring overwhelming firepower down on the enemy even more quickly and to even greater depth. Beginning in the 1980s, Soviet military writers began referring to another revolution in military affairs, based on the development of military electronics, including computers, sensors, and communication systems. This revolution was producing a qualitative change in the effectiveness of non-nuclear weapons, making them as militarily effective as tactical nuclear weapons.<sup>1</sup>

Stephen Peter Rosen, *Winning the Next War*

We all feel that we live in an age with very rapid technological change. This calls for swift adaptation in order to follow the trends in society and function well professionally. Alvin and Heidi Toffler have described the change we are undergoing as *The Third Wave*. According to them, this is a fundamental change from an industrial society to an information-based society.<sup>2</sup> This is a fundamental change within our civilization that will effect the way we acquire wealth, form family, media, and politics. According to the Tofflers this will also reflect the way we make war.<sup>3</sup>

These changes especially in technology, have triggered the view by many that we have entered a *revolution in military affairs* (RMA). Such a RMA involves a paradigm shift in the nature and conduct of military operations which either renders obsolete or irrelevant one or more core competencies of a dominant player, or creates one or more new core competencies, in some

new dimension of warfare, or both.<sup>4</sup> Many see the Gulf War and the operation in Kosovo as a confirmation of such an ongoing RMA.

Douglas A. Macgregor has in his book, *Breaking the Phalanx*, stated that “Whether there is a current revolution in military affairs is still being debated. What is certain, however, is that organizational changes in armies can produce revolutionary changes in warfare.”<sup>5</sup> Richard O. Hundley in his RAND report, *Past Revolutions--Future Transformations*, confirms this and states that new technology has to be merged with new operational concepts, new doctrine and force structure.<sup>6</sup>

This chapter will analyze some of the ongoing technological changes in order to merge it with changes in doctrine and organization. The chapter will cover the fundamental functions of communication, intelligence and logistics. It will also cover the triangle of mobility, firepower and protection. Finally, the chapter will cover some trends in organizational development.

#### Communications and Network Centric Warfare

An organization with a decentralized command system is by design less dependent on information and information flow than an organization with a centralized command system. This reduces the strain imposed on communications during operations. Due to such lower communications needs, a decentralized command system also reduces the vulnerability communications pose on the battlefield. For a small country like Norway, this poses very significant advantages if a conflict should develop with a superpower like Russia. An acceptance of reduced communications requirements also provides an opportunity to utilize civilian and commercial communications capacities to its full extent and thus prioritize modern and high capacity military communications resources to the most potent maneuver units. Such a concept for prioritizing communications resources takes maximum advantage of the Norwegian Total Defense Concept and allows available money to be used where it gives most “bang for the buck.”

Norway has a very well-developed strategic military and civilian communications network. All communications except radio and television are digital, and radio and television are currently on the verge of becoming digital. A majority of the Norwegian population are already on the internet with 640,000 PCs sold only in 1999. Of these users, a significant portion (550,000) already have their private PCs connected to the internet by a high speed communications system. This system--ISDN, has a capacity for sixty-four KB per second.<sup>7</sup> ISDN is currently being replaced by a new system, ADSL, that has thirty times the speed and capacity of ISDN.<sup>8</sup>

The Norwegian mobile telephone infrastructure is excellent and the use of mobile telephones is extensive with 1.4 million new mobile telephones sold in 1999.<sup>9</sup> A new WAP (Wireless Application Protocol) mobile telephone system is currently taking over from the current generation digital GSM system. This allows for a direct communication between the mobile telephone system and the Internet. This capability will be enhanced by replacing current fixed infrastructure with a new UMTS (Universal Mobile Telecommunication System) that allows for up to 100 times the speed and capacity of the current GSM system.<sup>10</sup>

The seamless integration of a mobile telephone system and the fixed information and communications system represented by the Internet, provides the basis for a civilian distributed high technology based command, control, computer, communications, and information (C4I) system. Such a civilian C4I system can be used for military purposes as part of the Total Defense Concept and will be able to connect the different units and capacities. It will also enable a wide distribution of close to real-time information.

As part of the Total Defense Concept, such an approach to using civilian resources is not new. The difference is that civilian resources now will be able to provide very high quality C4I system at a very low price. The challenge for military users is basically to adapt the technology for military proposes. Once such a civil-military C4I system is operational, the different

capacities and units will be able to mutually support each other and thus create a significant synergy effect on the battlefield. According to David S. Alberts, John J. Garska and Fredrick P. Stein, the authors of the book, *Network Centric Warfare: Developing and Leveraging Information Superiority*, such mutual support or *self-synchronization is perhaps the ultimate in achieving increased tempo and responsiveness*.<sup>11</sup> Self-synchronization must thus be viewed as a *mode of interaction between two or more entities*.<sup>12</sup>

The C4I system forms the technological basis of a Network Centric Warfare (NCW) system. However, it must not be forgotten that NCW is about human and organizational behavior. NCW is based on adopting a new way of thinking--network-centric thinking--and applying it to military operations. NCW focuses on the combat power that can be generated from the effective linking or networking of the warfighting enterprise. It is characterized by the ability of geographically dispersed forces (consisting of entities) to create a high level of shared battlespace awareness that can be exploited via self-synchronization and other network-centric operations to achieve commanders' intent.<sup>13</sup>

Extended use of C4I systems have generally been viewed to be the hallmark of a centralized command method that tries to establish control over the battlefield. This is not the case in maneuver warfare where the command method instead focuses on thriving in a nonlinear environment. However, the fact that warfare will always be characterized by fog, friction, complexity, and irrational circumstances does not negate the benefits that network-centric operations can provide to the forces in terms of improved battlespace awareness and access to distributed assets.<sup>14</sup> The use of a C4I system must thus be utilized to maximize own capabilities by achieving a better performance in the fitness landscape that is described in the tempo portion of chapter 4.

Implementing a C4I system is expensive. The establishment of a NCW capacity is, however, irreversibly linked to having such a C4I system. The entry fee can be viewed as the

information technology structure. It is also destructive for the potential synergy effects of NCW to only implement a C4I system partially within an organization or in only a portion of the organization, for example with the highest priority formations. According to Metcalf's Law this is due to when the number of information nodes in a network increases linearly, the potential effectiveness of the network increases exponentially due to the effectiveness being a function of the interaction between the nodes.<sup>15</sup> A large network with numerous nodes is thus desirable. The costs of such a system will, however, increase close to proportionally with the size of the C4I system.

Renewal of such a C4I system also becomes a significant problem since there is a very rapid development in computer processing technology, software and communications need. According to Moore's Law, the performance of computer chips has doubled every eighteen months as a direct result of increasing component density. This is a development that seems to continue for the time being. However, based on Moore's Law, Bell Laboratories, has identified that fundamental limits to chip density will be approached in 2012, when semiconductor gate sizes reach atomic limits.<sup>16</sup> The rapid change in computer technology may thus be reduced within the coming decade, allowing for lower expenditure on C4I renewal. However, until this is proven to be correct, there will be a great need for updating C4I systems continuously.

Since it is the commercial sector and not the military sector that is driving the evolution within communications and computers, it is economically beneficial to use commercial hardware and software as much as possible. The Norwegian Total Defense Concept also allows for securing hardware and services from the commercial and private sector during crises and war. This enables the establishment of a significant civil-military C4I system for the fraction of the costs of a compatible purely military system. Since money is a limitation, a civil-military C4I system will according to Metcalf's Law be hugely beneficial compared to a purely military system.

There is, however, vulnerability concerns with a civil-military C4I system. Fixed communications infrastructure opposed to mobile hardware, environmental protection against temperature, humidity, electromagnetic pulses (EMP) etc, and security provides concerns. Some of these concerns, like security (encryption) and environmental protection (hardening), are also relevant for the civilian market, and are thus being pursued by manufacturers. Others are purely military concerns and must be solved with military funding. This will result in a mix of civilian hardware and military equipment that has to be interoperable. Based on risks to different parts of the area of operations, there has to be established a balance between military and civilian equipment to enable maximum development of a C4I system and thus utilization of available resources.<sup>17</sup>

### Intelligence

Sun Tzu stated: "Know the enemy and know yourself, in a hundred battles you will never be in peril. When you are ignorant of the enemy but know yourself, your chances of winning or losing are equal. If ignorant both of your enemy and of your self, you are certain in every battle to be in peril."<sup>18</sup>

Intelligence has always been of great importance in warfare. This is especially the case in maneuver warfare, where the intent is not only to know what the enemy is doing and preparing for, but also knowing him well enough to deceive him. Technological improvements and innovations can help in getting a better picture of the battlefield. This will, according to the authors of, *Network Centric Warfare: Developing and Leveraging Information Superiority*, enable smaller combined arms combat formations with advanced indirect- and direct-fire weapon systems to dominate larger areas than in the past. Aided by enhanced surveillance capabilities in the form of unmanned aerial vehicles, airborne radar and satellites, fewer ground forces can now concentrate the effects of combat power against the enemy. Rather than move to contact, all arms units electronically search and then destroy the enemy on the battlefield.<sup>19</sup>

Intelligence is not only about reconnaissance, surveillance and observation. It is also about analysis and distribution of information to those who best can use it. A developed C4I system with fuzzy logic applications and nonlinear modeling, as mentioned in chapter 5, will enable such distribution of information. It will also support the analysis and the development of enemy courses of action by using the above mentioned applications and models. A well-developed C4I system will also enable a split base concept for analysis. This will enable certain specialized analysis functions to be centralized in order to gain advantages of limited know-how and reduce time required to finalize different types of analysis. The concept is based on the fact that electronic information travels at the speed of light, while experts that do on site inspection and interrogation at best can travel around the battlefield with the speed of a helicopter. Such a split base concept for analysis also enables better interpersonal coordination in specific intelligence areas, like for targeting and battle damage assessment (BDA). It will also provide enhanced security in certain sensitive areas.

A split base analysis concept must, however, not result in the front-line units not getting the information that is relevant for their operations. The intelligence information part of the C4I must be based on a push forward concept that makes information available while it still has value.

The information that becomes intelligence will come from a number of different sources. The trend has been to move from human to technological gathering. This has in many ways huge benefits since technological sensors in many cases can observe where soldiers can not get access. Technological sensors are also generally more expendable than soldiers. The problem for the Norwegian Army is, however, that units must be prepared to operate in an environment with enemy air superiority and with an enemy with very sophisticated air defense systems. This will significantly reduce the effects of information gathering from airborne sensors.<sup>20</sup> There will thus exist a significant requirement for ground based information gathering from different types of sensors, including soldiers.

Reduction in the use of airborne sensors can, however, be compensated through advances in communications, electronics and miniaturization. This will enable the positioning of small smart sensors in areas that have to be vacated by soldiers. Observation, guidance of fire support, release of horizontal firing mines, BDA and others can be done by remote control.

With operations in the littorals, as would be the norm in North Norway, information from maritime sensors will also play a major role. Information gathering must thus be viewed as a joint and combined effort that when merged will give ground force unit commanders a best possible picture of their respective areas of interest.

### Logistics

Movement of information has become far less costly and time consuming than the movement of things. Logistics must take advantage of this fact to its fullest. It must also take into account that by implementing maneuver warfare as a doctrine, traditional deliberate planning, massing of forces, use of reserves, restricted information flows, and emphasis on unity of command will be a legacy of the past. Dispersed operations over a wide area of operations will be the norm. Information distribution will here be decisive and while the information age will not eliminate the fog and friction of war, it will surely significantly reduce it, or at the very least change the nature of uncertainty (in the rear area).<sup>21</sup>

The aim of logistics must be to provide the necessary support where it is needed at the right time. Monitoring and prognosis of logistics requirements and status of available logistics in operations thus becomes essential. The sum of requirements and availability will form the basis for resupply, evacuation, repairs and reconditioning. The difficult issue becomes how to conduct dispersed logistics support.

The best solution is a combination of reducing the overall logistics requirements, providing the right logistics support and reducing the logistics tail or foot print.<sup>22</sup> The reduction in logistics requirement can be achieved three ways. First, is to reduce the consumption by

weight and volume of logistics like fuel and ammunition by implementing new technologies and systems that are less logistically demanding. The second is to organize forces for operations with limited duration. This sharply reduces the logistics footprint that has to follow the formation as to opposed to units that are organized for prolonged operations. The results of focusing on limited duration are formations and units that are designed for agility and high-tempo operations.<sup>23</sup> This opens for a split-base logistics concept. Third, according to Martin van Creveld in his book, *Air Power and Maneuver Warfare*, the focus on high speed and tempo will sharply reduce casualties and logistics demands by itself.<sup>24</sup>

However, the focus on high tempo formations and units applying maneuver warfare doctrine will produce one major logistics challenge. These formations and units go *deep* and lines of communication between them and the logistics base may be severed due to there still being enemy forces that have not been defeated or destroyed. This requires, in order to have flexibility, the maneuver units to have a balanced sustainment package with them, and that this logistics is distributed far down into the organization in order to allow for dispersed operations. In addition, there must be a limited logistics reserve in order for commanders to meet the unexpected, take risks, and utilize windows of opportunity. Logistics support and evacuation must be possible in order to sustain the momentum of any operation. Swift movements between rear logistics bases and maneuver units must thus be possible.

Such movements must be viewed as a joint endeavor. Maritime, air and ground assets must be utilized in a flexible manner. Especially air transport with helicopters will be beneficial due to short response time, precession delivery and the ability to conduct evacuation.<sup>25</sup> Even if air transport can be shot down, it has the advantage of not being dependent on infrastructure like bridges, that can severely hamper resupply by landlines of communications.

North Norway is flanked by the sea to the west and north. This makes the sea the major logistics line of communication on the strategic and operational level. However, the sea, fjords,

inner leads and major rivers must also be viewed as logistics lines of communications on the tactical level. Such transport was immensely important during the campaign in 1940 and will be so in any future conflict.<sup>26</sup> Modern attack craft, like the ones already in use by the Light Missile Batteries in the Coast Artillery, would be ideal for such operations.<sup>27</sup>

However, logistics support over land must not be neglected due to enemy threats and weather that may leave other options impossible. Such logistics transports will have to be prepared to fight their way forward against remnants of enemy forces or against flank security if the intent is to link up with maneuver units that have cut-off major enemy forces. Such transports must have the capacity to resupply cross-country, in deep snow and across rivers. However, most heavy logistics, like artillery ammunition, will have to follow some type of road network. Such transports may use the extensive network of lumber roads that exist along most valley sides. Road transports will be best suited to re-supply fixing and flanking forces, and the artillery that provides deep fire support for the maneuver forces.

The Jeger battalions will operate up to 200 to 300 kilometers deep. Logistics support for these forces is complicated and must be conducted through a combination of establishing depots and resupply and evacuation. Heavy and voluminous logistics like fuel, water, food, and some types of ammunition can very well be prepositioned ahead of operations and in such abundance that it secures flexibility over a large area of operations. More critical items like blood, certain types of precision ammunition will however, have to be resupplied. Fixed wing air transport with airdrops or airplanes that can land on lakes or on snow is one option. The use of helicopters is another option, but threats, range, and duration may in many cases limit their use. Open sea and land flanks do also pose possibilities for use of sea and cross-country resupply and evacuation.

#### Protection

The Norwegian infantry uses different types of cross-country vehicles that all have little or no ballistic protection. These vehicles are the Heggland's Bv 206 that can take up to seventeen

soldiers, the smaller and older Bv 202, snowmobiles and all terrain vehicles (ATV). The Bv 206 and Bv 202 are used year round while the ATVs are used on bare ground and the snowmobiles during winter.

There exists an armored version of the Bv 206, called Bv 206 S. The French Army is the first significant user of the Bv 206 S for operations in Kosovo.<sup>28</sup> There also exists a larger model called BvS 10. The UK Royal Marines have started to acquire a significant number of these vehicles.<sup>29</sup> Acquiring such ballistic protected all-terrain vehicles for the Norwegian Army does, however, have a significant political impact. This is due to Norway having a small CFE limitation on armored vehicles. This quota is already filled by equipping the cavalry with eight maneuver battalions and two independent squadrons, and by having a motorized infantry battalion with wheeled APCs (SISU) for international operations. Equipping the whole infantry with IFV or APC is therefor not an option.

However, the CFE treaty does only cover ballistic protection in the form of IFVs or APCs for rifle squads with more than five soldiers. Specialized functions like command, evacuation, antitank, engineer, reconnaissance vehicles are not included in the treaty. This allows for establishing traditional armored protection for a number of function. The issue thus becomes how to provide sufficient protection for the remainder of the infantry.

Maneuver warfare calls for sacrificing organic protection in order to enable a high tempo. This tempo combined with firepower will then provide protection by itself. This concept can be viewed as an analogy to a fighter aircraft, where armor would only contribute to reducing speed and agility of the aircraft while it would not by itself be enough to prevent it from being shot down. Adding more armor would only reduce range and thus decrease the value of the fighter aircraft even more. The same principles apply for vehicles that are to be used by maneuver units. However, operating on land does not follow the same rules as in the air. The

speed is much lower and even over-snow vehicles are less vulnerable to weight than aircraft.

This should allow for protective measures against light enemy fire.

Use of terrain for masking and protection is the current infantry approach. However, this can easily be countered by screening forces, surveillance and indirect fire. As enemy surveillance and C4I technology develops, the use of terrain as a protective measure will be significantly reduced even for dispersed forces. This calls for protective measures that can deflect different types of enemy firepower. This can be achieved by using medium ballistic protection on the most vulnerable parts of the vehicles. Such protection can be achieved with modular ballistic plates which can be screwed to the welding supports on the vehicle. Such plates mostly consist of glued ballistic ceramic tiles wrapped in a covering material providing protection against external factors such as rain, mud, impacts or cuts.<sup>30</sup> This is the approach that is used by many armies in peace support operations (PSO) such as in Bosnia and Kosovo. Such modular protection can be shaped according to the threat and can for instance enable light reconnaissance vehicles to engage enemy screening and flanking forces frontally. However, increase in weight may lead to only vital parts of the vehicle being protected. The remaining protection will have to be for the personnel themselves.

A number of armies have ongoing projects for updating existing protection and lethality of the individual infantry soldier. The most advanced of these projects combine protection, firepower, communications, and situation awareness.<sup>31</sup> However, weight of these new systems does pose a problem and there is a question of if the soldier should fight mounted or dismounted.<sup>32</sup> Since the focus of maneuver warfare is tempo, this suggests as many mounted operations as possible. Such fighting does, however, not call for a large portion of the soldiers within the units to sit passive within vehicles. They should instead be able to man weapon systems that allows for immediate engagement once enemy forces are identified. This will by

itself provide significant protection to own forces, as shown by the Israelis in Sinai during the 1973 war for combating AT-3 and RPG anti-tank weapons.

Primarily mounted fighting in difficult terrain does, however, call for an exceptional degree of terrain mobility. ATVs and snowmobiles have such mobility. They have, however, no protection and the soldiers are very exposed. Norwegian trials providing for protection of the vehicle and establishing weapon mounts have not been successful. Experiences with Bv 206 also show that terrain mobility decreases as weight increases. This is, to a lesser degree, the case for the older Bv 202 that is only half the weight. This suggests that vehicles for primarily mounted operations should be small and light, resulting in only vital parts being armored. Such vehicles would at the same time have a small manning, resulting in them being allowed by the CFE treaty.

Additional protection should focus on body armor for the soldiers. This could be a relatively heavy modular armor allowing for leaving the heavy portions of it behind for dismounted operations.

Such light armored vehicles can, however, gain additional protection through other means. The fighter aircraft analogy can once again be used. Stealth is one approach. Reductions in emission, signature, noise, and reflection will reduce the ability to identify vehicles and distinguish vital equipment from less important. It is possible to use certain surface linings in order to achieve such signature reduction against radar and infrared. Such lining can function against one or multiple frequency bands. Most battlefield reconnaissance radars operate in the range of 8-18 and 35 GHz. Seeker-heads in the range of 94 GHz and thermal imagers in the range of 3-5 and 8-14  $\mu\text{m}$ .<sup>33</sup> Such signature reduction can also be used selectively thus enabling deception.

Protection also includes the threats of mines, and especially remotely delivered mines. This can be achieved by applying linear above the floor to take up shock and fragmentation. The Survival chances of the crew can be further enhanced by the installation of: (1) shock-proof seats

(so-called “enhanced” seats) with collapsible basis, (2) foot rests not integrated in the floor, (3) shock-absorbing storage bins for equipment, hand weapons, ammunition, and (4) shock-absorbing mountings for electronic and optical elements.<sup>34</sup>

Indirect fire will pose a significant threat to light armored vehicles and personnel. This threat can be significantly reduced by employing electronic warfare assets to protect own forces. Whittaker’s SHORTSTOP is an example of such a system. By sensing radiation from electronic fuses, it will reflect the same signals, but stronger, thus making shells explode above effective height.<sup>35</sup> Similar active protective measures can be used in the form of flares, smoke, electromagnetic induction and jammers.

It is also of vital importance to avoid “blue on blue” engagements. Without some sort of identification system (IFF) the ability to do dispersed operations at a high tempo may suffer significantly due to implementation of control measures that aim at reducing fratricide.

The implementation of a C4I system, allowing for NCW will also provide for additional protection through warning, allowing for counteraction. Such counteraction is the use of air defense systems, camouflage, evasive action, disbursement. The aim must be to find a mix of systems that allows for a level of protection that does not reduce the mobility and firepower of the maneuver unit.

### Firepower

Mobility is more important than firepower in maneuver warfare. It is, however, not possible to win engagements without destroying at least parts of the enemy force. Without such a destructive force, mobility becomes irrelevant since the enemy is not forced to take our forces into consideration. Eventually it is the threat of annihilation by well-positioned firepower that forces an enemy commander to abandon his intent.

Combining high mobility and sufficient firepower thus calls for light weapons and light ammunition loads. Since the enemy in most cases is well protected and dispersed, this again calls

for a high hit probability. Both current and new technology gives us this high hit probability through guided weapons. So far, guided weapons have primarily been used for air-defense (AD) and for anti-tank (AT) purposes, and the weapons have been line of sight systems. In the Norwegian Army such systems are today, the TOW and ERYX anti-tank systems and the RB-70 laser guided short-range air defense system (SHORAD).

The sole use line of sight systems is, however, changing with the emergence and implementation of indirect precision fire ammunitions. Such ammunition can be fired at longer ranges by mortars (PGMM), different types of artillery and in the form of missiles. For infantry use, the PGMM and the fiber optical guided missile (FOGM) seems to be the most interesting developments. Combined with a NCW approach to using firepower, it will become possible to deliver precision ammunition against forces that are out of visual range. The range of the systems will also allow for concentration of effects without concentration of forces.<sup>36</sup> This will in itself be a significant contribution for establishing surprise. This may sound too good to be true, and in some ways it is. According to RAND studies, PGMM and precision guided artillery ammunition have limited search areas that leads limited effects against moving targets.<sup>37</sup> When this is combined with enemy countermeasures, a high effect on enemy targets can only be achieved through a combined arms approach where different weapon systems with different characteristics are used. For light infantry, this calls for arming the forces that first observe the enemy with weapons that can destroy his vehicles alone and in combination with indirect fire support. Thus, forward observers and reconnaissance troops become fighting forces and not only information gatherers. Such an organizational change combined with additional dispersion on the battlefield calls for an increase in such forward-deployed forces. These armed reconnaissance forces become the units that open and secure gaps that can be exploited by the follow on maneuver forces. Reconnaissance forces thus secure the speed and tempo of the maneuver units.

It is these maneuver units that must have the heavy combined arms firepower that enables them to, if necessary, to destroy whole enemy formations quickly with support from artillery and aviation. Without such heavy firepower it will not be possible to inflict sufficient damage on the enemy, even if it is done by an indirect approach, and at the same time keep a high tempo. Limited firepower and engagements on short ranges will extend the duration of these engagements and become logistics intensive. This will reduce the tempo of operations and the enemy will drag our forces into a battle of attrition instead of maneuver.

An enemy will try to counter our PGM capability in order to survive engagements and even our combined arms approach may not be effective enough. In such cases, it is important to neutralize or destroy the enemy countermeasures. New technology like high-power microwave (HPM) weapons may be one solution to knock out electronic systems and thus create critical vulnerabilities.<sup>38</sup> Such weapons already exist and can knock out electronic systems, vehicles, communications, and computers. The Swedish Army has tested a Russian type with a ten gigawatt effect. This is a small weapon that can be stored in a briefcase with an effective range of a dozen meters. However, larger and more directed HPM weapons will have an effective range of several hundred meters.<sup>39</sup> Such HPM weapons can either be laced on a weapons platform, launched as payloads or be positioned on the battlefield like smart AT mines.

New technology can also be used to improve existing weapons systems. Precise target accusation sights with laser range finders, ballistic computers, and systems for compensating for wind and temperature can dramatically improve hit probability and effective range. Such systems also make it possible to engage moving targets at extended ranges. Advances in electronics will also provide increased lethality for existing weapon systems like the automatic grenade launcher (AGL). By introducing electronically programmable ammunition for the AGL, it is possible to get an increased effect out of high explosive ammunition and at the same time get an additional

effect by letting the grenades explode above trenches, uneven ground. Such a system will also have effects “around the corner” in built-up areas.<sup>40</sup>

Advances chemistry and metallurgy are resulting in new explosives, alloys, propellants, and composites. This allows for more effective or lighter ammunition. It also enables an extension of existing weapons systems effective life due to revitalization of their effects.

Firepower is not only about the individual weapon system engaging individual targets. Engagement of multiple targets by a number of different weapon systems simultaneously will create a synergy effect that is essential in order to achieve swift results. The C4I system must thus have a capacity for control of effects that allows for maximum payoff for the unit. The intent of such a system must be to allow the individual weapon systems operators to choose targets that give them a best possible firing opportunity, according to the description of fitness landscape in chapter 4. This calls for a type of control that focuses on desired effects and allows for maximum freedom at lower levels of command.

The fitness landscape is about how the individual subunit optimizes the use of the situation. For weapons operators this usually means to be able to engage the enemy and destroy or neutralize him before he can engage you. This can be achieved by having a longer range of your system than he has. However, the enemy can call in fire support or initiate countermeasures that negates this advantage. The aim thus becomes to use the landscape or environment to own advantage.<sup>41</sup> In the Norwegian geography, with mountains and steep valleys, this calls for mobility to gain favorable positions. Such positions can, however, only be reached by having the right mobility. The effects of firepower are thus irreversibly linked to mobility.

### Mobility

I would say that we need mobility most of all on the battlefield.

S. L. A. Marshal, *The Soldier's Load and the Mobility of a Nation*<sup>42</sup>

Mobility for maneuver units has to combine duration (operational mobility), the ability to negotiate terrain and acceleration/speed (tactical mobility).<sup>43</sup> In addition, the vehicles that give the mobility have to be a weapons platforms or carriers and have a minimum of protection. The vehicles also have to provide a certain level of comfort for its personnel. Without such crew comfort, it will be impossible to conduct continuous operations with a high tempo over an extended period.<sup>44</sup>

The combination of these factors have in most cases lead to one or two areas being sacrificed in order to provide for the others. The nation that has best has been able to find a balanced compromise has been the Soviet Union. They managed to find an acceptable level of protection and firepower that also took into consideration all three dimensions of mobility. Most of their tracked vehicles have a good tactical mobility and are amphibious or can ford and they generally have a very good cross-country capacity. The emphasis has, however, been on meeting operational mobility requirements. As a condition for its acceptance by the armed services, every type of Soviet combat vehicle have sufficient fuel capacity to take it at least 600 kilometers.<sup>45</sup> Such an operational mobility allows for the conduct of deep operations.

The current Bv 206 and Bv 202 are year round vehicles that are amphibious, and negotiate roads and terrain excellently. They do, however, today lack protection and the Bv 202 can not be used as a weapons platform. The Snowmobiles and ATVs are by design not year round vehicles. This might from the outside not be seen as a big problem since it is possible to change vehicles two times a year. However, the climate changes from the inland to the coast, it usually snows numerous times before it settles in, and climate and snow conditions vary significantly by height. The valley floor may be free of snow while the mountainsides have some snow and the high areas have lots. This shows that there are two long transition periods during fall and spring where the current vehicle configuration is disadvantageous. Both the snowmobile and the ATV also lack basic human comforts that enable the soldiers that use them to conduct

continuous operations over an extended period. They also both have very low operational mobility and are not amphibious.

The ideal solution is to find a vehicle or a series of vehicles have sufficient protection, can be used as a weapons platform, has a tactical mobility year round that is better than the current Bv 202 and Bv 206 and in addition has a operational mobility. It calls for a lightweight tracked all terrain vehicles with an amphibious capacity to take over the role of most of the snowmobiles and ATVs. Such vehicles must also be larger than the current vehicles in order to be both a stable weapons platform and in order to take a crew of three or four soldiers. For continuous operations during winter conditions, four soldiers are probably better than three. The design and weapons configuration will be the deciding factors. This vehicle--the Tracked Strike Vehicle (TSV), would be the tracked and amphibious equivalent of the light strike vehicles that numerous Special Forces are using today.

The terrain mobility of both the Bv 202 and Bv 206 is based on both vehicles being built after an articulated concept where two individual driving trains are connected making a vehicle with four independent tracks. This allows for excellent terrain grip and steering. This concept also allows for a reduced mobility if one track should be thrown due to enemy fire, mines. A TSV should follow the same design concept.

The use of helicopters and fast attack craft for logistics purposes has already been mentioned. These capacities can also be used to transport maneuver forces. There is, however, a mobility issue concerning such types of transports. Without vehicles the infantry is left on foot and has a very low speed of advance. This can be rectified by using TSVs for mobility once the helicopters have landed or the attack crafts have put the forces ashore. Such use of TSVs will reduce the number of troops but give a very high mobility and also make it possible to bring heavier weapons systems. It will also be significantly easier to withdraw from raids when such mobility on the ground is available.

There has to be a capacity to transport logistics cross-country. Today, this is done by Bv 202 and Bv 206. The Bv 202 has a capacity for 750 kg while the Bv 206 can take 2000 kg.<sup>46</sup> Comparing the time it takes to bring these vehicles forward over long distances and their capacity, we experience some of the same problems that existed in the time of horses and oxen. A significant portion of the logistics capacity can be used up during the forward transport and for the return. There is also the problem of axis being significantly reduced once many vehicles use it. This is especially the case for difficult terrain during winter conditions. A logical approach is to reduce the number of vehicles and use vehicles with a larger load capacity. The Norwegian firm NATEC, already produces such a vehicle--the NATEC P6. This vehicle has a cross-country load capacity of 7000 kg. The vehicle is already in use within the Norwegian Army as a carrier for EW jammers.<sup>47</sup>

To enable both better tactical mobility and operational mobility, it is necessary to implement new technologies and new concepts. Herman Grosch has in an article, *All Electric Combat Vehicle (AECV)--Vision and Reality*, stated that for an electric driven tracked vehicle there will be a twenty-five to fifty percent increase in dash speed and acceleration. There will also be increased range, silent vehicle movement, and a fifty to one hundred percent increase in cross-country speed.<sup>48</sup> This can be combined with a seventy-five percent reduction in fuel consumption for heavy diesel engines. Possible power trains are hybrid-electrical systems and fuel cells.<sup>49</sup>

Rolf Hilmes, has in his article, *Aspects of Future MBT Conception*, looked at additional benefits of implementing electric drive technology into tracked vehicles. The use of an electric energy transmission is expected to offer the following advantages in respect to vehicle design and logistics considerations, (1) Greater flexibility in the arrangement of the drive components (such as wheel hub motors), (2) Continuously variable driving and steering and control operations, complete coupling of wheel *revolutions and motor revolutions*, optimized configuration of the

power pack (high power density motor), (3) Energy recovery through brake operations (on connection with magnetic-dynamic storage), (4) Higher overall efficiency of the drive line, (5) High reliability through low consumption wear and tear and service components, (6) Simple realization of automated functions (power control, drive-by-wire, remote control) (7) Reduction of utilization costs through almost wear and tear-free and low-service drive/transmission system, built-in test system for self-diagnosis, problem-free long-term storage.<sup>50</sup> The implementation of electric driven vehicles will also solve numerous electric power uses that today are supported by stand-alone power packs and generators. It will also be possible to power future power intensive systems and functions like EW, HMP weapons, communications, command posts, engineer, and repair systems.

Hybrid-electric drive technology is already used commercially in the *Honda Insight*, that only uses 3,36 liters per 100 kilometers.<sup>51</sup> The power train thus already exists. For Norwegian industry, it should not be a problem to participate in development and production of hybrid-electric driven tracked vehicles. NATEC already producing tracked vehicles and the all-electric car, Think, is also Norwegian produced. Expertise and production facilities thus already exist.<sup>52</sup>

#### Organization

It is of vital importance to change the structure of organizations as new technologies and methods are implemented. If such change is not implemented, organizations will not provide an optimal effect towards their objectives.

Implementation of information technology should reduce the workload for a number of previously manual staff functions. Combined with the understanding of war as a nonlinear process and the resulting concept of command-by-influence, there is a significant opportunity to reshape the traditional military structure. One such option is to flatten the hierarchy.<sup>53</sup> According to John P. Kotter in his book, *Leading Change*, such a reduction in levels within a hierarchy is the future development within all organizations.<sup>54</sup>

As the combined arms concept is pushed downwards within the military organization, it is a question of if the divisional level of command is still valid. Richard E. Simpkin had already in 1985 in his book, *Race to the Swift*, declared that “we needed to rid ourselves of a sacred cow-- the division.”<sup>55</sup> Instead, he proposes an organization based on corps and brigades. Simpkin’s view is shared by Jon R. Brinerhoff in his article from 1997, “The Brigade-Based New Army.”<sup>56</sup>

The retention of the corps-level and the elimination of the division-level will provide the corps with a large number of maneuver brigades. This will provide the corps commander with a high flexibility. However, based on the concept of command-by-influence and the need to reduce the additional workload the elimination of the division level will result in, it is essential that the brigades become flexible combined arms formations. With the disappearance of the divisional level, the brigades will also have to take over some of the functions of the division had. This also seems natural since new technology and a more dispersed maneuver concept will result in the brigades covering more ground.

More independent combined arms operations for the brigades will require a larger flexibility than they previously have had. This can be done by expanding the brigades in size or by reducing subunits in size and thus producing more sub-units. The need for high tempo and the implementation of new technology should reduce the need for additional mass. The solution should thus be to reduce the size of the maneuver battalions. This reduction should if possible be so significant that even with the creation of additional battalions, the overall structure becomes smaller. Implementation of a modern C4I system, more precision guided weapon systems, better tactical and operational mobility, and better protection should significantly reduce support functions and allow for a split-based logistics concept. Without the necessary reduction in battalion size and requirements, it will be very difficult to reduce the support requirement enough to change to a split-based support concept and thus harvest the great benefits in tempo that this concept provides.

Flexibility on the corps level should not only focus on the number of maneuver and support units, it should also be viewed as an ability to control resources from other services. This would be helicopters and shipping for mobility, and air-support and maritime support to maximize available effects in order to defeat enemy forces. The corps level can thus be looked upon as a joint command at the tactical level. It would also be at this level of command that it would be practical to employ allied reinforcement forces.

Flexibility within the corps should also cover different types of maneuver forces. Dedicated and specialized forces should conduct deep battle, rear-area security and flank protection. In addition, it would be beneficial to organize, train and equip forces specially for fixing an enemy force and for conducting the maneuvers that are necessary to defeat him. By doing this, it is possible to maximize the effects of the different forces and at the same time get an overall maximum effect out of available resources. The corps level will thus get maximum effect and have the flexibility to meet different challenges, while the brigades are less flexible to meet challenges beyond what they have been designed for.

For the maneuver battalion the reduction in size and the increase in operational mobility will significantly reduce the focus on logistics and administration. With a small logistics train, it should be possible to conduct continuous operations over three to four days. By this time soldiers will be exhausted, even if it is possible to sleep a little on the move, and there will be a need for logistics replenishment and maintenance.<sup>57</sup> Battalions can thus be designed light in order to operate with a high intensity for limited periods.

At company and platoon levels, firepower and mobility have to a large degree reduced the need for a large number of soldiers. There is one exception, and that is the rifle squad, where there still will be a requirement for foot soldiers to suppress, attack, destroy, and bypass enemy positions. This can at squad level best be done with three individual teams. The number of soldiers in the rifle squad can thus only be reduced to seven, allowing for one leader and three

two men teams. Mobile, and for the most part mounted operations, will reduce the overall requirement for rifle squads within the mobile maneuver battalions. This is also the case for the battalions that conduct deep operations. Nevertheless, this is not the case for the battalions that are to fix enemy forces, cover flanks and conduct rear-area security. They will, even with new technology, to a larger degree be dependent on traditional rifle infantry to cover ground in depth. With such a diversified organizational approach, it will be possible to acquire limited numbers of new high technology systems in order to keep a technological advantage within the highest priority formations. Used in combined arms units this will enhance the overall effect of these units. As the potential adversary implements countermeasures, it will be possible to acquire new systems that surpass these countermeasures. It will also at the same time be possible to pass on the now less effective weapons to lower priority units that still can make good use of them due to their different type of functions on the battlefield. This as a modification of the prototype approach in order to counter long-term uncertainties and at the same time satisfy short-term requirements, that Stephen Peter Rosen describes on his book, *Winning the Next War*.<sup>58</sup>

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<sup>1</sup>Stephen Peter Rosen, *Winning the Next War*, 257-258.

<sup>2</sup>Alvin and Heidi Toffler, *War and Anti-War*, 8.

<sup>3</sup>*Ibid.*, 2.

<sup>4</sup>Richard O. Hundley, *Past Revolutions--Future Transformations*, xiii.

<sup>5</sup>Douglas A. Macgregor, *Breaking the Phalanx*, 5.

<sup>6</sup>Hundley, xv.

<sup>7</sup>Aftenposten, *ADSL slår ut ISDN*, 1.

<sup>8</sup>Aftenposten, *Telenor setter turbo på nette*, 1.

<sup>9</sup>Aftenposten, *Mobile salgsvinner i fjor*, 1.

<sup>10</sup>Aftenposten, *WAP-bruken øker*, 1.

<sup>11</sup>Alberts, David S., *Network Centric Warfare: Developing and Leveraging Information Superiority*, 175.

<sup>12</sup>Ibid., 175.

<sup>13</sup>Albert, 88.

<sup>14</sup>Alberts, 11.

<sup>15</sup>Gilder, George, *Telecosm: Metcalf's Law and Legacy*, 158-166.

<sup>16</sup>Alberts, 248.

<sup>17</sup>Ronald K. Newland, *Tactical Deception in Information Warfare-- A New Paradigm for C4I*, 2-6.

<sup>18</sup>Sun Tzu, *The Art of War*, 84.

<sup>19</sup>Macgregor, 49.

<sup>20</sup>David Vaughan, Joel Kvitky, Keith Henry, Mark Gabriele, Goerg Park, Gail Halverson, and Bernhard Schweitzer, *Capturing the Essential Factors in Reconnaissance and Surveillance Force Sizing and Mix*, 55.

<sup>21</sup>Alberts, 72.

<sup>22</sup>Thomas J. Edwards and Rick Eden, *Velocity Management and the Revolution in Military Logistics*, 52-53.

<sup>23</sup>Martin van Creveld, with Steven L. Canby and Kenneth S. Brower, *Air Power and Maneuver Warfare*, 15.

<sup>24</sup>Ibid., 14.

<sup>25</sup>Viktor Suvorov, *Inside the Soviet Army*, 206.

<sup>26</sup>Donald Macintyre, *Narvik*, 176.

<sup>27</sup>Røen, Arild, *Programprosjekt 08-KA Mobile enheter*, 1.

<sup>28</sup>Christopher F. Foss, *France to get Bv 206 S vehicles*, 23.

<sup>29</sup>Christopher F. Foss, *BvS 10 ordered for Royal Marines*, 9.

<sup>30</sup>Dieter Kahl, *Protection as a Survival Philosophy for AFVs*, 79.

- <sup>31</sup>George and Meredith Friedman, *The Future of War*, 379.
- <sup>32</sup>Marvin Leibstone, *LAND WORRIOR Plus: A Program Update*, 93-96.
- <sup>33</sup>Kahl, 75.
- <sup>34</sup>Kahl, 81.
- <sup>35</sup>Rupert Pengelley, *Counter-Battery Systems: Varied Capabilities Are Essential For Weapons Location*, 37.
- <sup>36</sup>Robert R. Leonhard, *The Principles of War for the Information Age*, 123.
- <sup>37</sup>Randall Steeb, John Matsumura, Terrell Covington, Thomas Herbert, Scot Eisenhard, Laura Melody, *Rapid Force Projection Technologies*, 46.
- <sup>38</sup>Martin C. Libicki, *Illuminating Tomorrow's War*, 5.
- <sup>39</sup>Stig Agermose, *Devastating Russian Electronic Bomb Tested in Sweden*, 1-2.
- <sup>40</sup>Charles Q. Cutshaw, *New-era Striker delivers latest AGL advances*, 56.
- <sup>41</sup>Richard E. Simpkin, *Antitank*, 34.
- <sup>42</sup>S. L. A. Marshal, *The Soldier's Load and the Mobility of a Nation*, 73.
- <sup>43</sup>Richard E. Simpkin, *Red Armor*, 51.
- <sup>44</sup>Richard E. Simpkin, *Human Factors in Mechanized Warfare*, 22.
- <sup>45</sup>Viktor Suvorov, *Inside the Soviet Army*, 205.
- <sup>46</sup>Hägglund, *Hägglund Vehicles AB-- Combat Vehicles, all-terrain Vehicles and Vehicle Systems*, 1.
- <sup>47</sup>NATEC, *Narvik Technologies AS-- Militarized Tracked Vehicles*, 1.
- <sup>48</sup>Hermann Grosch, *All Electric Combate Vehicle (AECV)--Vision and Reality*, 37.
- <sup>49</sup>Sandra I. Erwin, *U.S. Targets Fuel-Guzzling Trucks*, 19.
- <sup>50</sup>Rolf Hilmes, *Aspects of Future MBT Conception*, 77-78.
- <sup>51</sup>Honda, *Honda To Showcase Green Car At Melbourne Motor Show*, 1.
- <sup>52</sup>Aftenposten, *Mye annet for samme pri*, 1.
- <sup>53</sup>Robert R. Leonhard, *The Principles of War for the Information Age*, 198.

<sup>54</sup>John P. Kotter, *Leading Change*, 172.

<sup>55</sup>Richard E. Simpkin, *Race to the Swift*, 290.

<sup>56</sup>John R. Brinkerhoff, *The Brigade-Based New Army*. 1.

<sup>57</sup>Richard E. Simpkin, *Human Factors in Mechanized Warfare*, 77-86.

<sup>58</sup>Stephen Peter Rosen, *Winning the Next War*, 245.

## CHAPTER 9

### CONCLUSION AND RECOMMENDATIONS

#### Introduction

Armed forces execute dominating maneuver when they successfully exploit technology, organization, training, and leadership to attain qualitatively superior fighting power as well as dramatic positional advantage in time and space which the enemy's countermeasures cannot defeat. Such operations result in a paralyzing blow against an opposing force with near- simultaneous effects (in depth and) on every level of war.<sup>1</sup>

Douglas A. Macgregor, *Breaking the Phalanx*

No country poses a short-term direct military threat to Norway. However, Russia as a politically, ethnically, and economically unstable country does pose a potential security risk to Norwegian sovereignty. Due to the vital strategic importance of the Kola complex, North Norway or parts of North-Norway may in a future crisis be the aim of Russian aggression. Such an attack could be triggered by events outside the region, but have a spin-off effect that might lead to a Russian requirement to expand its security zone around the Kola complex to include parts of North Norway. This is the scenario that forms the basis for doctrine, organization and training of the Norwegian Army.

#### Conclusion

Maneuver warfare theory accepts Clausewitzian friction to be an integral part of warfare. The aim is to have a military organization that can function with friction and exploit the opportunities that friction represents vis-a-vis the enemy. By using this approach, it is possible to reduce the impact friction has on own forces and increase the effects it has on the enemy. This significantly contributes to enhancing own relative combat power.

Less own friction and increased enemy friction will also enhance the relative tempo of own operations. This allows for acting before the enemy can counter our actions. It also allows for multiple actions that eventually will lead to a dislocation of the enemy. This can be a

geographical (positional), functional, temporal, or moral dislocation. Such dislocation will eventually lead to the enemy having to refrain from reaching his objectives. This leads to the defeat of the enemy or, if required, ultimately to his destruction. Tempo must be combined by attacking the enemy through an indirect approach. This is basically to attack him both morally and physically through his weaknesses--his critical vulnerabilities. By doing this on multiple lines of operations sequentially or simultaneously, it is possible to deny him critical requirements for his critical military capacities. Without these critical capacities, the enemy's strength will disintegrate and own forces have in fact destroyed his center of gravity indirectly. However, to be able to use the indirect approach, the conditions for it must be created. Deception is the major tool for opening multiple lines of operations and for creating critical vulnerabilities.

Not all lines of operations will geographically be open for ground forces. They must be opened by force. The critical vulnerabilities or targets for the maneuvers will also in most cases be well defended. Swift neutralization or destruction of such screening and guarding forces require the use of combined arms to create a synergy effect that enemy forces will not be able to counter. It will also require flexibility within the military organization, or reserves, that can exploit opportunities once they emerge as results of engagements or friction.

Such exploitation of appearing opportunities requires a high level of initiative. Such initiative can only be achieved in an organization with a decentralized command system. This calls for a system of command-by-influence. Only by having conveyed to all leaders the intent of the operation will it be possible to achieve such initiative and maintain a high tempo. A prerequisite for a successful execution of this command method is a leadership style that encompasses trust within the organization. The ability for a commander to convey his intent also hinges on personal communication and understanding between commanders at different levels. The commander also needs a "feel" of the situation on the battlefield, where reports are not enough. This requires his forward presence and the use of liaison officers. Only by having a

good understanding of the situation will it be possible to make swift decisions. Such decision making under a time-constrained environment can best be achieved through intuition. It is, however, important to take into consideration that both emotions and heuristic thinking influences the outcome of such decision-making.

The environment of North Norway with both very challenging terrain and climate, and with limited infrastructure will require that special considerations are taken to ensure the use of all available resources. This will in the future, as now, call for a joint approach to planning and execution of operations. It also requires special considerations for training, organization and equipping of the military organization.

### Recommendations

#### Introduction

It is self-evident that a Norwegian Army doctrine based on maneuver warfare theory must have a foundation within a national joint doctrine. It must also be within the broad guidelines of NATO's Land Forces Doctrine in order to avoid losing unity of effort for operations both within Norway and abroad.

#### Organization

The anticipated level of military spending combined with a need for implementing new technology will force the Norwegian Army to be reduced in size. Transfer of equipment from the Army to the Home Guard will, however, enable the size of the Home Guard to stay at the current level for the foreseeable future. The Home Guard will thus be able to continue its role as a nation wide territorial land force protecting against raids, sabotage etc. It is thus recommended that the Home Guard should take over the whole responsibility for the territorial defense as the Army is reduced in size. This will allow for a greater concentration of remaining Army maneuver forces.

It is recommended that these Army forces primarily should be organized into one corps with a number of combined arms brigades, infantry regiments, combat support and combat

service support forces. This corps should have an advanced C4I system and the ability to control forces from other services and allied forces, thus making it a combined joint headquarters on the tactical level. Beside a number of organic combined arms brigades and infantry regiments, there should be the ability to take control over additional infantry regiments that can be released from protecting reception and staging areas once allied forces have arrived in country.

Within the corps, it is recommended that there should be one jeger regiment for the conduct of deep battle. It should have five jeger battalions that are smaller in size than the current ones. It should also have a combat service support organization and a reconnaissance capacity. The jeger battalions should be equipped with more standoff weapon systems and vehicles with an operational mobility.

It is recommended that the corps have a minimum of three motorized infantry regiments that can conduct deep maneuver operations. In order to have good flexibility, these regiments should have a reconnaissance battalion and four motorized battalions. These should be significantly smaller battalions than the current ones, with better tactical and operational mobility. These battalions should also have a much higher number of standoff weapon systems and a balanced logistics package that enables continuous operations for three to four days. On the regimental level, there will be a requirement for additional combat service support and combat support. Due to the need for tempo, and operational and tactical mobility, it is recommended that artillery is not an organic part of the regiment. Instead, the regiment should have FOGM and mortars with PGMM. Remaining heavy fire-support should come from the corps artillery regiment and aviation.

The corps should also have organic two infantry regiments. One should be able to take up existing fortified positions with fortress battalions and the other should have a number of field battalions to secure flanks and decisive points. The mobility should be based on requisitioned

vehicles. Additional regiments of this type could become available to the corps as allied reinforcements arrive.

It is recommended that the corps should have a minimum of two combined arms brigades. They should have a nucleus of four cavalry battalions; both armor, antitank, and armored reconnaissance. In addition, they should have one motorized infantry battalion for deep maneuver and for utilizing difficult terrain.

The organization of additional battalions in the brigades and regiments together with a significant reduction in size, will increase tempo of operations and increase flexibility. This will also allow for smaller companies and platoons that will make it easier to reach a high level of tactical and technical skill within these units.

The corps should be organized with a rear headquarters for planning, controlling lines of communication, reception, employment and sustainment of forces. A forward command post must be able to command the forward combined arms brigades, infantry regiment and fire support.

#### Tactics

It is recommended that a Norwegian Army maneuver warfare based doctrine must encompass tactics that focus on attacking enemy weaknesses and avoiding his strengths. These tactics should be in accordance with the concepts described in the above mentioned conclusions about maneuver warfare.

Current Norwegian Army doctrine has already a number of these aspects imbedded in it. It should thus form a good foundation for implementing a concept based on attacks along multiple lines of operations simultaneously. The current doctrine is, however, still too terrain oriented. The focus on three principle phases of operations--control, maneuver, and destruction, is outmoded. It is recommended that the focus should be changed to a more mobile, flexible and continuous approach instead of a sequence of events that leads to the enemy being destroyed in a confined area.

The control phase that has the intent of fixing the enemy, should be changed to close maneuver with the intent of reducing the enemy's tempo. Since tempo is a relative perception, this will in fact be to fix him. The difference is that the enemy may still move, but own forces will have a higher tempo that will enable us to defeat him.

It is recommended that close maneuver should be a form of mobile defense in depth in order to achieve economy of own forces. This can be viewed as a mobile version of the elastic defense that the German Army developed during World War I. The major difference would be mobility, the additional use of space and the range of weapons systems.

It should primarily be mobile units and formations with heavy fire support that conduct close maneuver. The combined arms brigades with well-protected cavalry battalions are ideal for this type of operation. The motorized infantry battalion within these brigades will be effective when using restrictive terrain. The less mobile field battalions and the Home Guard units should cover secondary axis and secure flanks, while fortress battalions should occupy strongpoints. Counterattack should be conducted by the combined arms brigades.

The current maneuver phase focuses on splitting and cutting the enemy into sizeable portions in restrictive terrain. This is in itself a very static view that focuses on fixing the enemy. It is recommended that the phase be changed to deep maneuver with the intent of defeating the enemy. Such deep maneuver should build on the legacy of German infiltration tactics from World War I and the use of mobile German forces as part of the Blitzkrieg concept. The aim should, however, not necessarily be on envelopment, but instead build on the principles of Soviet deep operations in order to achieve paralysis using an indirect approach. Due to high tactical and operational mobility, it is recommended that it is the motorized infantry battalions that conduct deep maneuver. However, in the right situations whole combined arms brigades should be used to get the additional effects that the cavalry and heavy fire-support represents.

The jeger battalions operate at depths of 100 to 300 kilometers. These are areas where it must be expected that the enemy have local air superiority. This can only be countered by having a very dispersed concept of operations in time and space. This will not allow for a concentration of effects on a limited area. Instead, the focus must be on attacking as many critical vulnerabilities as possible over a large area. It is recommended that this approach should be called deep battle.

The current destruction phase should be changed. The focus should be on close battle with the intent of destroying remaining enemy forces. Close battle should if possible be avoided since it reduces our own tempo and is resource intensive. It must, however, be expected that whole enemy units and formations have to be destroyed in order to achieve an overall defeat. Own forces that have the ability to go conduct deep maneuver should if possible not be used for close battle.

All types of infantry forces can conduct the close battle. However, the focus on using motorized forces for deep and close maneuver calls for the employment of field battalions to take over the role of destroying remaining enemy forces. With concentration of fire-support, it should be possible to use tactics based on the principles of stormtroop tactics from World War I.

The refinement of tactics and deception operations for close maneuver, deep maneuver, deep battle, and close battle will require definitions for intents, methods and tasks. It will also require a better terminology for describing mobile warfare in order to get a better focus on decentralized command, effects on the enemy, and the use of the indirect approach. Once this is achieved, it will be possible to institutionalize a maneuver warfare based doctrine through education, training and exercises.

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<sup>1</sup>Douglas A. Macgregor, *Breaking the Phalanx*, 37.

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